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Navy charts its future in the air . . . . . Page 25
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AMERICAN AVIATION

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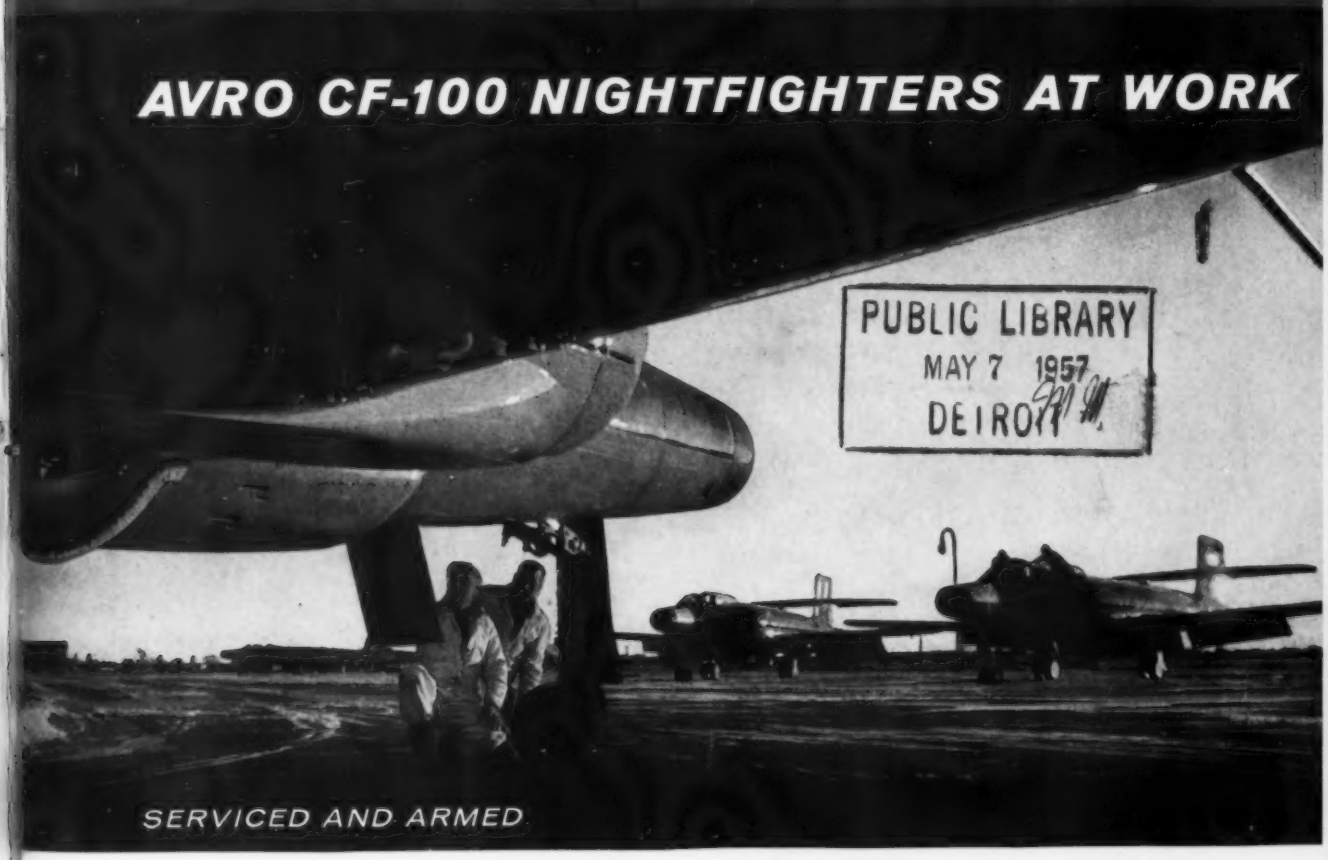
AVRO CF-100 NIGHTFIGHTERS AT WORK



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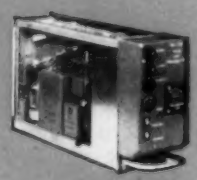

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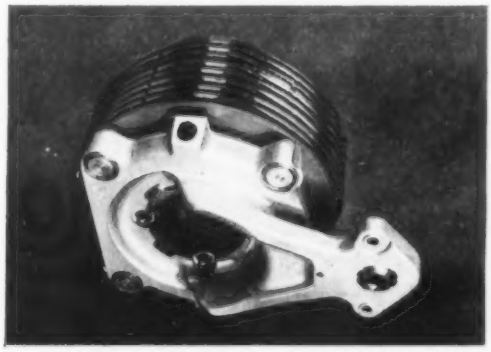

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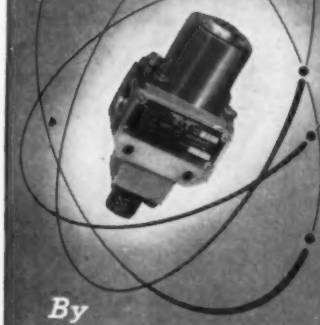

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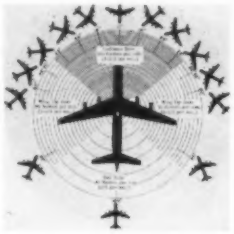
AMERICAN AVIATION

WORLD'S LARGEST AVIATION PUBLISHERS

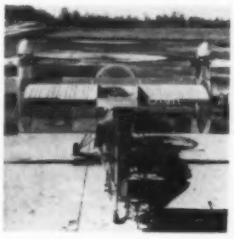
How new anti-collision lights work

White strobe light system invented by Northwest Airlines pilot wins favor in demonstration at National Airport. Diagram and story, page 34.



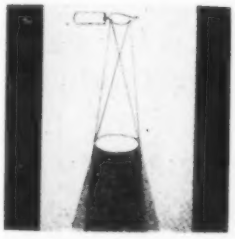
Vertol's tilt-wing VTOL near flight test

First design details of Vertol 76 disclose two ducted fans, one in vertical and one in horizontal stabilizer, for pitch and yaw control. Analysis by William Beller, page 41.



Precision radiography: valuable inspection tool

X-ray inspection technique is big help in production of electronic tubes and equipment. Penumbra effect, shown here, presents problem, however. Analysis by Henry P. Steier, page 45.



Aircraft overhaul in Costa Rica

SALA has developed overhaul business of major importance to economy of Costa Rica. Much of its work is done for LACSA, Costa Rican flag carrier. For full details, see page 69.

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62,900 Copies of This Issue Printed.

Navy charts its future . . . Blueprint for Naval aircraft and missiles procurement and development programs for next few years is given in an exclusive interview with Vice Admiral William V. Davis, Jr. by one of American Aviation's military editors, Lois C. Philmus. Missiles will NOT completely replace manned aircraft; better combat planes, new seaplane family are planned. Full story, page 25.

Transonic wind tunnel at Ohio State University is one of many facilities available to NAA engineers for advanced research.

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Are Air Routes Foreign Aid Grants?

THE RECENT BITTERNESS and controversy engendered by the latest air agreement between the U.S. and The Netherlands granting new air concessions on this side to the Dutch airline, KLM, serve to point up the obsolescence of the air bilateral machinery of this country.

There is nothing to indicate that the situation which sparked such deep feelings and such intemperate maneuvers will improve until the U.S. overhauls the machinery.

In our opinion the U.S. airlines, the Dutch, the State Department and the Civil Aeronautics Board are all both right and wrong in the parts they played respectively. It is the machinery plus the extreme inefficiency that pervades most of the Department of State which is at fault.

The United States has become the greatest originating center for air traffic in the world. It is an understandable magnet to all foreign airlines. It is not without reason that the American carriers fear that there will be no end to the increased participation in this lush market to the continued detriment of both American domestic and overseas services.

It is a natural phenomenon that any airline company knocks itself out to win the richest routes, tapping the lushest markets, but airlines do have an obligation to satisfy their primary markets as well. Air transport got under way in Europe years earlier than in the U.S., but it has been the U.S. industry that has showed the way to mass transportation at low cost and developed the market the Europeans now want to tap.

We would feel much more comfortable about a wide-open market if the European carriers showed some real inclination to cut their own costs and began to provide genuine mass transport for their own peoples on the Continent. This should come first, rather than exerting such desperate efforts to tap a soft market developed by those (in the U.S.) who have operated airlines as efficient, low-cost businesses instead of taking the easy road of high fares, low utilization and service for the few.

There was a time when the awarding of air routes was supposed to have something to do with traffic requirements and traffic potential. Such a concept is ludicrous in the light of decisions by this government in the past half-dozen years. Traffic justification seems to be the least important qualification. An air route is awarded today as a part of foreign aid with political and military overtones and without any real or implied relationship to air traffic patterns of the U.S. and the world. The decisions are made by persons far removed from air traffic and economic considerations.

It is a tragic situation and one that cannot easily be rectified. But a fresh look and a fresh approach *must* be made or there will be serious trouble ahead.

It is not only in bilaterals that a fresh look is needed. Even the U.S. needs to examine its own international air policy and put this examination into the framework of the world pattern. It was somewhat of a shocker even to those close to the industry to note in a tabulation submitted by the U.S. Controller General to the Celler subcommittee in the House that this country paid out $203 million in subsidy, excluding mail pay, under the separation formula, to Pan American Airways in the 10-year period starting with 1946.

Perhaps there was full justification for this vast amount during that decade. But the entire subsidy picture, currently at least, needs to be placed on the open table if airlines such as TWA and Northwest, which worked hard to get off subsidy some years ago—and succeeded astonishingly well—are to be treated fairly as part of the U.S. international network.

We have no concrete proposal at this point except to submit that U.S. international aviation policy internally and externally needs to be reviewed by an organism of government that combines the CAB, the Department of State, the Air Coordinating Committee, and representatives of either Congress or the air transport industry or both. At the moment the Department of State is poorly equipped to handle bilaterals except as foreign aid giveaways, and CAB has been shoved to one side. The sole recourse to fairness now is Congress which, in this country, should be the last resort and used only when all other means fail. Sooner or later the taxpayer must have his say.

Worth Trying

AT LAST there is to be an umbrella-like terminal built which will provide an over-hang to cover at least the major portions of transport aircraft while loading, unloading and servicing. Pan American's announcement that it will build such a terminal at Idlewild should create a lot of interest.

The only such existing terminal in the world is Tempelhof at Berlin, where airplanes up to DC-4 size taxi under the big overhang. This project was built under the Hitler regime prior to World War II. How PAA manages to handle turbojets—assuming that the New York Port Authority will eventually recognize the facts of life—remains to be seen, but we're glad to see somebody take the lead in protecting passengers from the elements and those vast pools of water which seem to frequent every ramp area when it rains.

Wayne W. Parrish

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LETTERS

Praise for Transport Issue

To the Editor:

I have just received my copy of AMERICAN AVIATION'S Annual Air Transport Progress Issue. I have not read all the articles, but I have had the opportunity to read a number, and look over most of the information. I have attempted to look at it from the viewpoint of a lay person with an average interest in the field of aviation, and feel that it is one of the best editions that you, or any other magazine, have ever presented.

My reactions were that it covers many phases, the articles are definite and specific, they are not too long, and that this issue contains information which is of great value to anyone interested in aviation, regardless of his particular specialty. I think the arrangement and presentation, including your two fine editorials, are well done and timely.

Please accept my congratulations to you, your editors, and the entire staff for an outstanding job. This is a real contribution. *MILTON W. ARNOLD, Vice President-Operations & Engineering, Air Transport Assn.*

Prince is full general

To the Editor:

With reference to your item concerning the Prince of the Netherlands in your March 25 issue (page 80), I would like to point out that his Royal Highness is actively serving in the Royal Netherlands

Air Force in the capacity of Inspector General. As Inspector General, he holds the rank of full general and not, as you stated, of lieutenant colonel. *H. F. C. HOLTZ, Colonel, Chief of Staff Inspector General RNAF, Hilversum, The Netherlands.*

Sonic booms

To the Editor:

Concerning Mr. Hammond's article "Sonic Boom" in your April 8 issue (page 31): Certainly the majority of public claims of damage resulting from the sonic boom are invalid, but this is no reason to distort the facts.

It is not highly improbable that damage from the sonic boom extends farther than damage from a nuclear or thermonuclear bomb. The catch here, of course, is that nuclear bombs are designed for area annihilation, whereas the sonic boom inflicts linear damage.

The width of this path of violent pressure change depends upon such things as the frontal area of the generating object, the distance from the object to the ground, and the relative attitude of the object. The length depends upon the attitude and range of the object, and could conceivably be extended many times the 13 miles mentioned in the article. The pattern of destruction depends upon the route flown by the object.

All this is probably recognized by you, but this gives me a chance to congratulate you on your "new look." BILL STANSBEARY, *Las Vegas, Nev.*

The NEW American Aviation

To the Editor:

. . . I do think you have done a wonderful job in face-lifting your magazine. I always liked the old format, probably because I had become so used to it. But I must admit the new look adds both to the clarity of the presentation and the readability of the contents, which are always of top interest to anybody involved in this business of ours. . . . *E. V. RICKENBACKER, Chairman of the Board, Eastern Air Lines, New York, N. Y.*

Congratulations on your new format . . . I am particularly impressed with the yellow sheets which can be extracted and carried for ready reference. *LADDIE HAMILTON, President, Ozark Air Lines, St. Louis.*

In answer to your "dear boss" letter on Page 10 of the March 11 issue, I am pleased to offer my most favorable comments on AMERICAN AVIATION'S new look. From cover to cover, I have found this first issue most interesting. The "contents page" photos are excellent and tend to whet the appetite of the reader for the many interesting articles to follow. Thank you for the consideration you have given your readers in making these changes. *VERN TAYLOR, Seaboard & Western Airlines, New York International Airport.*

Anti-collision idea

To the Editor:

The other day I ran across a pretty fine thing dealing with this business of near collisions, a subject that is pretty important to all of us.

Hal Henning, operations manager of General Motors Air Transport Section of the Detroit City Airport, is proposing for VFR operation the use of smoke-puff trails or artificial contrails as a means of doing something about mid-air collisions.

To me the idea is novel and has merit. Certainly, it is not the complete answer but the complete answer we will only get when airborne proximity radar warning is fully developed. It would appear to me that in the meantime something like Hal proposes, which certainly would be low-cost, could be used as a stopgap.

Perhaps the thing that would work against Hal's idea is that it is simple and in this day of complicated electronics and deep thinking the simple solutions are usually kicked out the window.

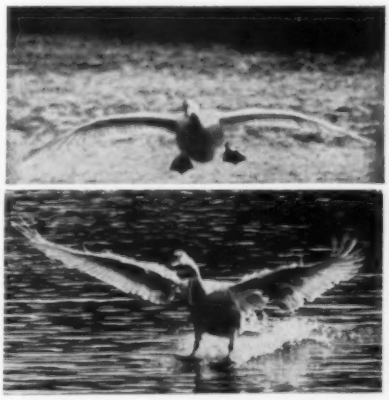
In any event, if you too could see any merit in the plan, you might also be able to think of some way to give it a push. *F. X. MARA, United States Aviation Underwriters, Inc.*, New York, N.Y.

Winged perfection

To the Editor:

The enclosed swan landing picture seemed praticularly apt for your magazine. Swan No. 2 (top) has lowered flaps for final approach; No. 1 (bottom) is touching down at about 20 mph and his expression indicates it isn't his first landing.

Swans live to an age of 200 years. This could be an inspiration to some of our older pilots. This particular airman might be 150 years old. J. J. HEATLEY, *Smithtown, N.Y.*



Editor's note: Actually, both swans were in the same picture taken by Mr. Heatley, with No. 1 on the water, No. 2 a safe distance behind and to the left.

Unfunny incident

To the editor:

. . . I enjoyed your repeat editorial on the subject of the "unfunny incident" in the March 25 issue.

I have known of many cases of thoughtlessness and discourtesy in the past committed by both airline pilots and private pilots. The solution of the problem you brought out would seem to lie in education, common sense and common courtesy on the part of all concerned, not in more unenforceable regulations.

I can remember flying before the war in Miami when they used to raise a big checkered flag when a scheduled ship was due to arrive or depart. Local traffic continued to circle until the flag was lowered. Some similar system might be developed today for fields like Lawrence where there are only a few scheduled flights a day.

Another solution which we have been trying to plug with the Curtis Committee lies in the providing of alternate short runways at large fields for the lightplane traffic or the reinstitution of the old practice of having the small planes use a grass area off to one side of the runway where they are out of the way of the larger planes.

Perhaps you could help us in this area. At the same time the practice of airliners making straight-in approaches at uncontrolled fields should be forbidden. It has almost always caused trouble sooner or later in the past. *SAMUEL* FREEMAN, Advisory Committee, NATA, Somerset Airport, N. J.

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CONVAIR-*Astronautics, is building a new facility at San Diego, California, which will be devoted to research, development, manufacturing and preliminary testing of the U.S. Air Force's Atlas Intercontinental Ballistic Missile, as well as other projects looking into the future of astronautics.*

AIRTRENDS

Air Force discounts Soviet nuclear threats against European NATO countries as little more than psychological warfare. Reds have been hinting that U.S. allies equipped with American missiles risk a shower of Russian ballistic missiles in event of war.

Air Force insists that the manned bomber will remain the nation's principal deterrent weapon for at least another 10 years because of its great accuracy. For this reason, USAF officers regard Soviet threat as psychological, although conceding that even inaccurate Russian nuclear missiles could do great damage in Europe.

Senate Armed Services Committee recently released a compilation of unclassified published reports on Soviet missile progress. It indicates that Russians are developing six ballistic and cruise-type missiles with ranges up to 10,000 miles. USAF also discounts this report, echoing recent statements by Gen. Lauris Norstad, SHAPE commander in Europe, that it's doubtful that Russian mid-range ballistic missiles present any immediate threat to NATO.

As tempo of major missile test firings picks up at Patrick AFB, Fla., the military services are finding themselves confronted with a new problem: how well does the public understand the purpose of missile flight tests?

Military press agents have been praising their own service's weapons so loudly and underplaying the importance of flight tests so much that the public is bewildered when a missile falls on its own launching stand or explodes at a few thousand feet.

A more forthright public information program on activity at Patrick has been suggested as one way to put the problem in better perspective. Points to be stressed: failure is a sought-after phenomenon in flight tests; long-term worth of a missile can't be determined by the first few flights. Within minimum security safeguards, much more information on Patrick activity can be released by the Pentagon.

Military spending during the current fiscal year looks like it will hit $38 billion—$2 billion more than the Administration predicted in January (see page 77). Heavy surge in outlays is felt mainly in aircraft, missiles and related hardware. Pentagon budget officers feel these items will run at least $1 billion more than earlier estimates. Faster-than-expected progress in missile development and production is a major reason for the increase. Another is the tight money situation, which is causing manufacturers to seek payments more promptly.

Air Force's plea for an additional six wings of heavy bombers has been denied for this year at least, but the door is still open for possible approval next year.

In recently-released testimony, Gen. Nathan Twining, Air Force Chief of Staff, said the Joint Chiefs turned down his proposal for 17 heavy bomb wings—six more than now planned. Air Force Secretary Donald Quarles explained, however, that the JCS decision was not final and that the proposal might be adopted later on.

Twining also told the House Appropriations Committee that Gen. Curtis LeMay, SAC commander, at one time wanted 40 wings of B-52s, that his lowest requirement was 21. Twining said the increase in B-52 wing strength would give Air Force the equivalent of 16½ wings of eight-jet bombers under the present program.

DIGEST

Modification in horizontal stabilizer blamed for second crash of Martin SeaMaster

A special modification applied to the horizontal tail stabilizer of the second Martin XP6M-1 SeaMaster caused the crash of the big jet flying boat on Nov. 9, 1956, according to The Martin Co.

The seaplane whipped into a tight inside loop when the flying "T" stabilizer went into a full nose-down position despite all the pilot's efforts to correct it. This forced the nose of the aircraft sharply upward and it began to break apart under a load of approximately nine gravities.

The crew ejected safely during the maneuver and the aircraft exploded at an altitude of about 5,000 feet, with the pieces falling over a wide area south of Wilmington, Del.

In an accident investigation report, Martin pin-pointed the horizontal stabilizer as the cause of the crash. The company had been conducting a program aimed at locating and minimizing in-flight vibrations.

In connection with this program, the elevators in the trailing edge of the stabilizer had been locked to the stabilizer in a neutral position so that the only moving horizontal tail section was the entire stabilizer. (This eliminated the normal upward deflection of the elevators for trimming purposes in high-speed flight.)

"With the elevators locked to the stabilizer, the hinge moments (of the stabilizer) shift in the compression direction, or to the weaker side of the stabilizer actuator cylinder," Martin said. "Revised calculations, on the basis of corrected data, indicate that, with zero elevator deflection, the stabilizer hinge moments could have approached, or exceeded, the maximum capacity of the stabilizer actuator at the maximum speeds attained at the time of the accident."

The accident occurred at about 20,000 feet when the pilot pulled out of a shallow dive. Analysis performed subsequent to the crash has shown that, with the elevators locked, "the stabilizer motion will still continue for a short time in the nose-down direction after an initial over-powering of the hydraulic system."

"The hinge moment level was very close to the compression capacity of the stabilizer actuator at the time that the last speed reading was taken," the report stated. "Only a slight disturbance, such as the pilot's pulling out of a dive, or a gust, was needed to overpower the stabilizer actuator."

Exploring little-known region

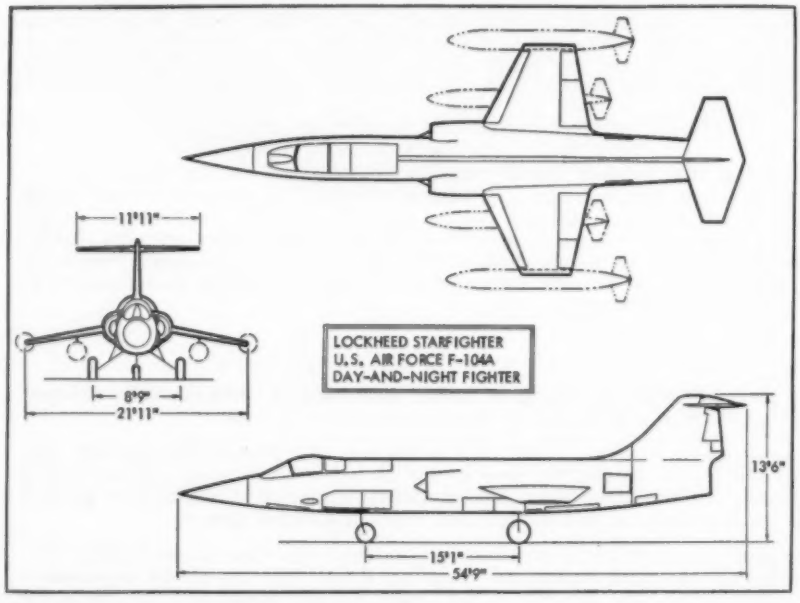
In explanation of the failure to anticipate the consequences of the locked elevators, Martin noted that the SeaMaster is the first large aircraft to be designed for high speeds at low altitudes and must accordingly be able to withstand airloads two or three times as high as any existing aircraft of comparable size.

The XP6M-1 "has been conducting exploratory developmental flight tests in a speed region where little is known about the aerodynamic forces involved for planes of this size, weight and speed characteristics, and where sudden and sometimes unexpected force changes can occur with increasing speed."

"The evidence in this investigation indicates that the possibility of error between aerodynamic calculations and actual flight test results is quite great in this realm of flight testing. Particularly is this true for an aircraft such as the XP6M-1 where the so-called '100 per cent boost' control system allows for no 'feedback' of forces to the pilot," the report said.

The company found "no apparent direct connection" between the loss of the second SeaMaster and the destruction of the first one over Chesapeake Bay in December, 1955. That aircraft was apparently destroyed because the horizontal stabilizer went into a full nose-up position, forcing the plane into a sharp outside loop. All persons were killed in the first accident.

Ironically, the locked-elevator technique employed on the last flight of the second SeaMaster resulted in a considerable decrease of in-flight vibration. The findings from the accident are being incorporated in a redesigned tail for the next batch of six SeaMasters, and it is hoped that the first of the new aircraft will fly late next fall.



World's fastest, highest-flying fighter

FIRST THREE-VIEW DRAWING of Lockheed F-104A. Dotted lines on wings indicate provisions have been made for installation of supplementary fuel tanks or external armament. Starfighter is in quantity production at Lockheed's California Division, will soon be assigned to Air Defense Command units.

T58-powered H-21D slated to fly this month

First flight of the Vertol H-21D equipped with General Electric T58 is slated for this month.

Vertol completed installation of the two turboprop engines in late April after a delay in delivery of the engines. Navy BuAer is sponsoring the flight on behalf of the Army which is paying for the project.

Sikorsky is conducting a similar project with its HSS testbed for a single T58 installation. Navy developed the T58 specifically for helicopters. It has been in limited production since late 1956.

USAF predicts 15-minute warning of ballistic attack, but says active defense will cost more than ICBM

The Distant Early Warning radar line guarding North America and the SAGE computing system can be modified with additional equipment to provide up to 15 minutes' warning of a Soviet attack with ballistic missiles, according to Air Force Secretary Donald Quarles.

In testimony released last week, the Air Force chief said this would be sufficient time to alert U.S. forces to prepare for retaliation and could "enormously reduce casualties" in the predicted target areas. He said the cost of the extra equipment would represent a "moderate fractional increase" over the present cost of the system.

Quarles told the House Defense Appropriations Subcommittee, that the development of detection and warning techniques will probably keep pace with the development of the intercontinental ballistic missile itself. He said the development of a positive anti-missile missile defense would probably take several years longer and estimated its cost would be "comparable" to that of perfecting the ICBM, assuming the nation decides to go ahead with it.

The Air Force Secretary did not say just what is being done to develop an ICBM warning system, but Richard Horner, Assistant USAF Secretary for Research & Development, had this to say:

"Our efforts in the defense against the ballistic missile are directed primarily toward the passive defense system, that is, the ballistic missile detection system . . . We feel we can solve the technical problems which will permit us a reasonable period of notice between the time we sight an incoming ballistic missile and the time of actual impact. There are quite a few things we can do with this response time.

"We do have some contracts, a limited number of small contracts, to study the active ballistic missile defense problem, identified with area defense. We would like to be able to find a system of defending from a few locations large areas against ballistic missile attack."

Maj. Gen. Bernard Schriever, in charge of the USAF's ballistic missile program, disclosed that he has a special "anti-anti" section in his organization which is working on means to circumvent the anti-missile missile. He agreed that it is theoretically possible to shoot down an ICBM, but added: "There is also no doubt in anyone's mind that it is a very difficult technical problem, and that is only to take care of the most unsophisticated type of a ballistic missile nose cone."

Rep. George Mahon (D-Tex.), subcommittee chairman, disclosed that he was also investigating the military missile program apart from his regular budgetary hearing. Results of this investigation are expected shortly in a second volume of defense hearings.

Civilian aircraft shipments rise 58% over 1955

Total airframe weight of civilian aircraft shipped in 1956 was 16,202,000 pounds, up 58% over the 1955 figure, according to statistics released by the Bureau of the Census and Civil Aeronautics Administration.

During the year 7,205 aircraft valued at $454.2 million were shipped, up from the 1955 totals of 4,820 and $271.3 million. Shipment of aircraft of 3,000 lbs. or over was up 71% to $355.8 million. Planes under 3,000 lbs. increased 48% in number, 46% in total airframe weight and 56% in value over 1955.

Civilian aircraft engine shipments in 1956 were 11,499, compared to 7,639 the year before. Total horsepower of the engines was 5,656,000 and value was $108.3 million, representing increases of 69% and 83% over 1955.

Newbury to resign Defense post soon

Frank Newbury, assistant defense secretary for research and engineering, will resign within a few weeks, according to Secretary of Defense Charles E. Wilson.

Wilson said Newbury came to Washington in 1953 to serve six months. He said Newbury had been trying to resign for some time.

RAF reveals details of missile program

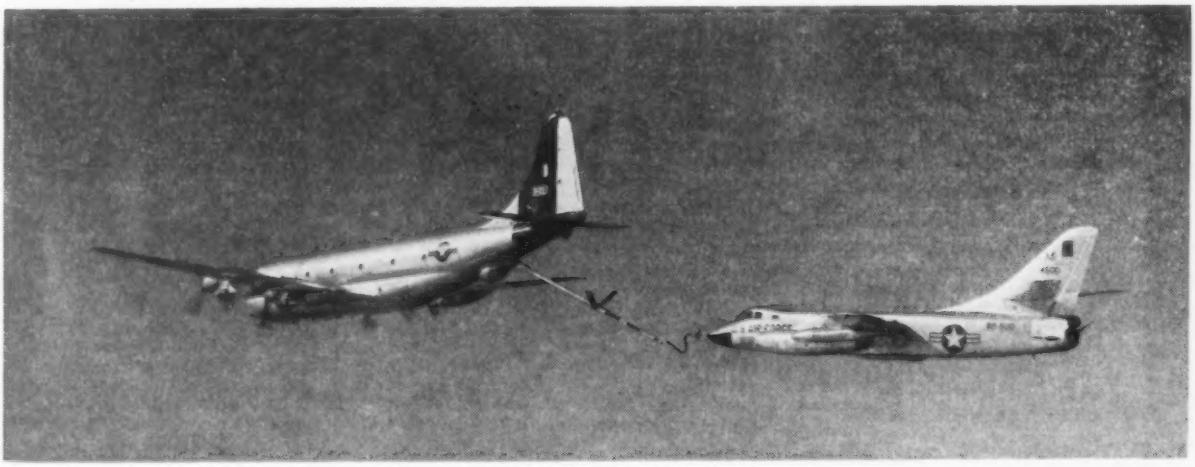
New details of the Royal Air Force's missile program have been given by the Secretary of State for Air in a memorandum accompanying the annual British Air Estimates.

The first RAF missile station is now being built at North Coates, Lincolnshire, and will come into use for service trials in 1958. Two new missiles—the de Havilland/Mullard Firestreak infrared AAM and the Bristol/Ferranti ramjet-powered Bloodhound SAM—are mentioned as being under development for operational use by the RAF. Full-scale service trials with the Fairey Fireflash AAM are about to begin.

The Firestreak also will soon begin its acceptance trials. It will be fitted to the Gloster Javelin and the English Electric P-1 fighters. A new Guided Weapons Branch of the RAF is being set up under Air Vice-Marshal D. G. Morris.

New refueler mates boom and probe-drogue systems

CONVERTING STRATEGIC TANKERS to tactical refueling units can be done in about two hours by using new boom-drogue adapter developed by Air Research and Development Command and the Shulz Tool Manufacturing Co. Boeing KC-97 with adapter refuels B-66B light bomber (below) and also can refuel North American F-100s which are equipped with probe masts for drogue-hose refueling. No permanent modification of the tanker is necessary.



WASHINGTON TRENDS

For Defense budget: a pruning knife

It's fairly certain now that House budget cutters will not spare Defense's 1958 request for $38.5 billion in new obligational authority. But seasoned observers look for a pruning operation rather than the ax—despite rumblings of deep cuts.

Rep. George Mahon (D-Tex.), chairman of the key Defense Appropriations Subcommittee, has hinted strongly reductions are coming. But he has expressed doubt savings will run as high as the $3 billion being pushed by economy supporters.

Mahon also has suggested that intense inter-service rivalry may be inflating costs. He has called upon President Eisenhower to exert his influence to end the "fierce struggle" as a step toward lowering the huge defense bill. The Texan has voiced belief the U.S. could purchase a reasonably adequate defense for $35 billion and cut out everything above that.

No timetable has been set, but Capitol Hill observers look for a final House report on the Defense budget shortly after mid-May.

How Pentagon cut AF request

Air Force program for fiscal 1958 originally provided for procurement of 1,923 new aircraft—408 more than finally authorized by Defense Dept.

This is disclosed in recently-released testimony of top military officials before the House Appropriations Committee. Air Force tendered a "minimum essential requirement" last November for $21.1 billion in new obligational authority. This was $2.5 billion less than its initial "flash" estimate last summer, but $3.4 billion more than it was allowed to request from Congress.

Of the 408 aircraft lopped off, 139 were Boeing B-52s, according to Air Force Secretary Donald Quarles. He said reduction of the B-52s together with their supporting bases largely accounts for difference between USAF's "minimum" estimate and what it was finally permitted to request.

Pentagon secrecy hit again

Several House members were prepared last week to introduce legislation to "break" what they called the "bureaucratic secrecy" at the Pentagon.

The congressmen charge that federal agencies generally are withholding information to cover up their mistakes and to hide facts.

Defense Secretary Wilson's reaction: Pentagon now is making maximum information available. He countered by charging the Democrats with challenging the constitutional separation of powers.

Authors of the new congressional action: Rep. John Moss (D.-Calif.); Rep. Dante B. Fascell (D-Fla.); Rep. William L. Dawson (D-Ill.).

Said Moss, who recently voiced "cautious optimism" over Wilson's plan to name a "declassification czar" at the Pentagon (AMERICAN AVIATION Apr. 8, p. 16):

"The only administrative information which can be restricted under the proposed legislation is that which is already held confidential by other laws, facts which must be kept secret to protect national security, or information which would result in unwarranted invasion of personal privacy."

A companion bill was to be introduced in the Senate by Sen. Thomas Hennings (D-Mo.).

Senate probes CAB 'leak'

Senate Permanent Investigating Subcommittee opened its public hearings May 1 on the apparent "leak" of Civil Aeronautics Board's August 2, 1956, vote in the New York-Florida Case, but there were no indications the "leak" had been solved.

Subcommittee intended to explore Atlanta and New England areas where the information of the "private" CAB vote became available. But subcommittee sources expected their major accomplishment would be to minimize future leak possibilities through public airing of the New York-Florida episode.

New procurement revision

A new Pentagon revision of Armed Services Procurement Regulation defines three types of data to be considered by contracting officers and the type information the government must receive on various types contracts.

Operational data: defined as information needed for instruction, maintenance, operation, evaluation or testing.

Design data: descriptive or design drawings necessary to permit another manufacturer to reproduce the supplies and services.

Proprietary data: "information concerning the details of the contractor's trade secrets or manufacturing processes which are not disclosed by the design itself and which the contractor has the right to protect from use by others."

This is first time rights of both contractors and the government to technical data involved in performance of military contracts have been spelled out.

Revision is designated Revision No. 21 to ASPR.

Ramjets for Navy missiles

RAdm. John Clark, Navy's guided missiles director, has made a plea for continued development of air-breathing missiles.

"Attention must continue on non-ballistic missiles, chiefly the ramjet," he says, pointing out that despite altitude and speed limitations, the ramjet can be guided and controlled in flight (see page 25).

Admiral Clark says final guidance is so important that a form of supplemental guidance may be needed even upon future ballistics missiles.

Navy Secretary Thomas Gates, however, says he knows of no long-range ramjet missile project in his service, that the Talos surface-to-air vehicle is the only new Navy ramjet.

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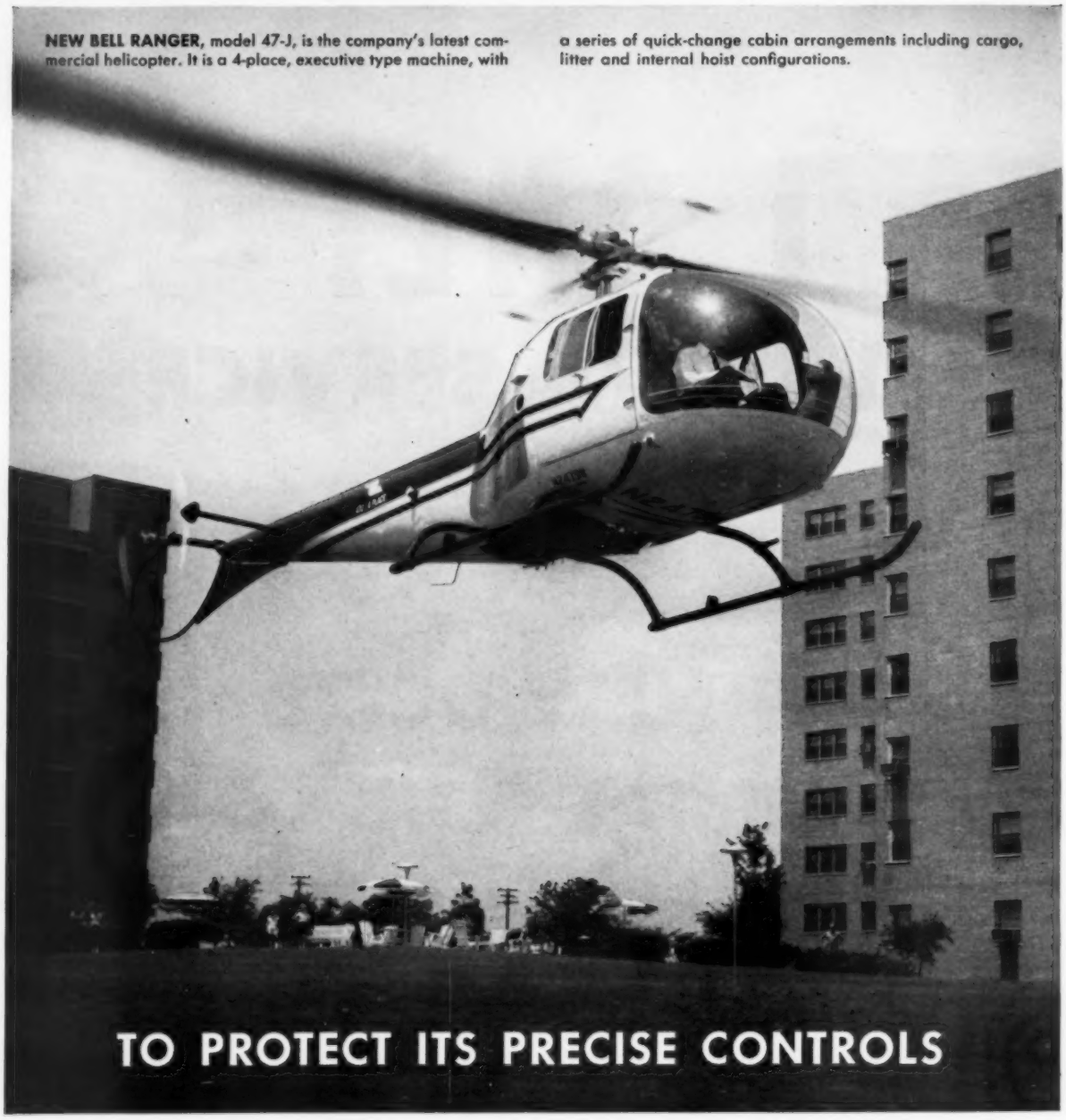

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WHEN-WHERE

MAY

Aero Medical Assn., 28th annual meeting, Shirley Savoy Hotel, Denver, Colo., May 6-8.

Conference on electrical engineering aspects of aircraft and missiles, AIEE, Biltmore Hotel, Dayton, May 7-9.

IRE and RTCA spring meeting, Ambassador Hotel, Los Angeles, May 7-9.

American Helicopter Society, annual national forum, Sheraton-Park Hotel, Washington, D.C., May 8-11.

Aeronautical Electronic Conference, sponsored by the IRE, Biltmore Hotel, Dayton, May 13-15.

Engine operation and maintenance forums, sponsored by Pratt & Whitney Aircraft and Pacific Airmotive. Cosmopolitan Hotel, Denver, May 14; Ambassador Hotel, Burbank, May 17; Hotel Claremont, Oakland, May 20; New Washington Hotel, Seattle, May 22.

Jet Age Airport Conference, sponsored by American Society of Civil Engineers, Park-Sheraton Hotel, New York, May 15-17.

Armed Forces Day, Open House at most U.S. Military Bases, May 18.

Armed Forces Communications and Electronics Assn., convention, Sheraton-Park Hotel, Washington, D.C., May 20-22.

Design Engineering Conference of American Society of Mechanical Engineers, Coliseum, New York, May 20-23.

Aviation fire safety seminar of National Fire Protection Assn., Hotel Statler, Los Angeles, May 20-24.

International Air Show, Le Bourget Airport, Paris, May 24-June 2.

Aviation Writers Assn., annual convention, Chase and Park-Plaza Hotels, St. Louis, May 26-June 2.

National Telemetering Conference, Hotel Cortez, El Paso, May 27-29.

JUNE

Annual maintenance and operations meeting, sponsored by Reading Aviation Service, Municipal Airport, Reading, Pa., June 1.

National Symposium on Production Techniques, sponsored by the Washington chapter of IRE, Willard Hotel, Washington, D.C., June 6-7.

Parks College annual homecoming and reunion, East St. Louis, Ill., June 7-8.

International and Military Automation Exposition, Coliseum, New York, June 9-13.

ASME semi-annual meeting, Sheraton-Palace Hotel, San Francisco, June 9-13.

Operations Research Conference, sponsored by Illinois Institute of Technology, IIT Campus, Chicago, June 12-14.

American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N.J., June 16-21.

National Conference on Military Electronics, sponsored by IRE PGME, Sheraton Park Hotel, Washington, D.C., June 17-18.

IAS national summer meeting, Biltmore Hotel, Los Angeles, June 17-20.

Aviation Distributors and Manufacturers Assn., 29th meeting, The Broadmoor, Colorado Springs, June 23-25.

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SPOTLIGHT

Sikorsky expects to keep the S-55 in production through 1959. About 1,200 of the transport helicopters have been delivered to date. Production of the S-58 and its turbine derivative, the S-61, will probably extend well into the next decade.

Although Hamilton Standard continues to diversify its production, propeller business shows no sign of dropping off markedly. Company has built about 700,000 propellers.

Pratt & Whitney is tooling up for large-scale production of the 7,000-lbs.-thrust J52, indicating there are good prospects for orders for several aircraft applications. To date, the engine has been ordered for only one model—the Douglas A4D-3. It would power the DC-9 if Douglas goes ahead with the project.

A second flight test of the North American XSM-64 Navaho was conducted in mid-March. Despite acute and almost comic difficulties, the big intercontinental missile succeeded in demonstrating booster separation and ramjet ignition—two unproven features of its operation.

Navy hopes to convert to all-jet basic training by 1959. It will replace current SNJ and T-28C basic trainers with the North American T2J.

Douglas Aircraft has scheduled a repeat showing of its air logistics demonstration (AMERICAN AVIATION April 22, p. 179) in Washington, this time for members of congressional armed services and appropriations committees.

Latest word on Willys Motors' flat cathode ray tube is that three tubes capable of producing red and green color pictures were delivered recently to Douglas Aircraft by Kaiser Aircraft and Electronics Co. Naval Research Laboratory is working to perfect a new-type transparent color screen for the tube. This would permit use of tubes as part of an advanced aircraft system for displaying navigation information on the widescreen.

Army Signal Corps has given the University of Illinois a $55,000 R&D contract to study possibilities of using the Moon as a relay transmitter for high frequency communications beams.

A Decca navigation system reportedly is being used to locate drones used in target practice over desert areas of the U.S. Drones transmit Decca signals to give their exact location for easy recovery. Bendix Pacific Division builds the system.

Donald W. Douglas admitted to the annual Douglas stockholders meeting that the company has some projects on nuclear power, "but they are in the study stage." Douglas' current payroll is averaging $1,860,000 per day, or nearly half a billion annually.

Armstrong Siddeley's Orion BOn 2 turboprop engine is now rated at 4,400 shp plus 1,950 lbs. thrust.

Blackburn and General Aircraft version of the Turbomeca Palouste is rated at 258 ghp. Engine is in production as a starter auxiliary power unit for large turbojets.

The 47 ft. wing and 58 ft. 8 in. fuselage of the Fairey Rotodyne helicopter has been transported from the company's Hayes, London plant to White Waltham airfield for final assembly.

Rolls-Royce RDa 11 Dart turboprop is rated at 2,100 shp., more than double the original RDa 1.

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RCA ANNOUNCES . . . THE

AVQ-60 AIR TRAFFIC CONTROL TRANSPONDER

Designed for airline, business, and military transport use, the AVQ-60 Air Traffic Control Transponder automatically and instantly enables the traffic control radar to locate and positively identify aircraft within its range.

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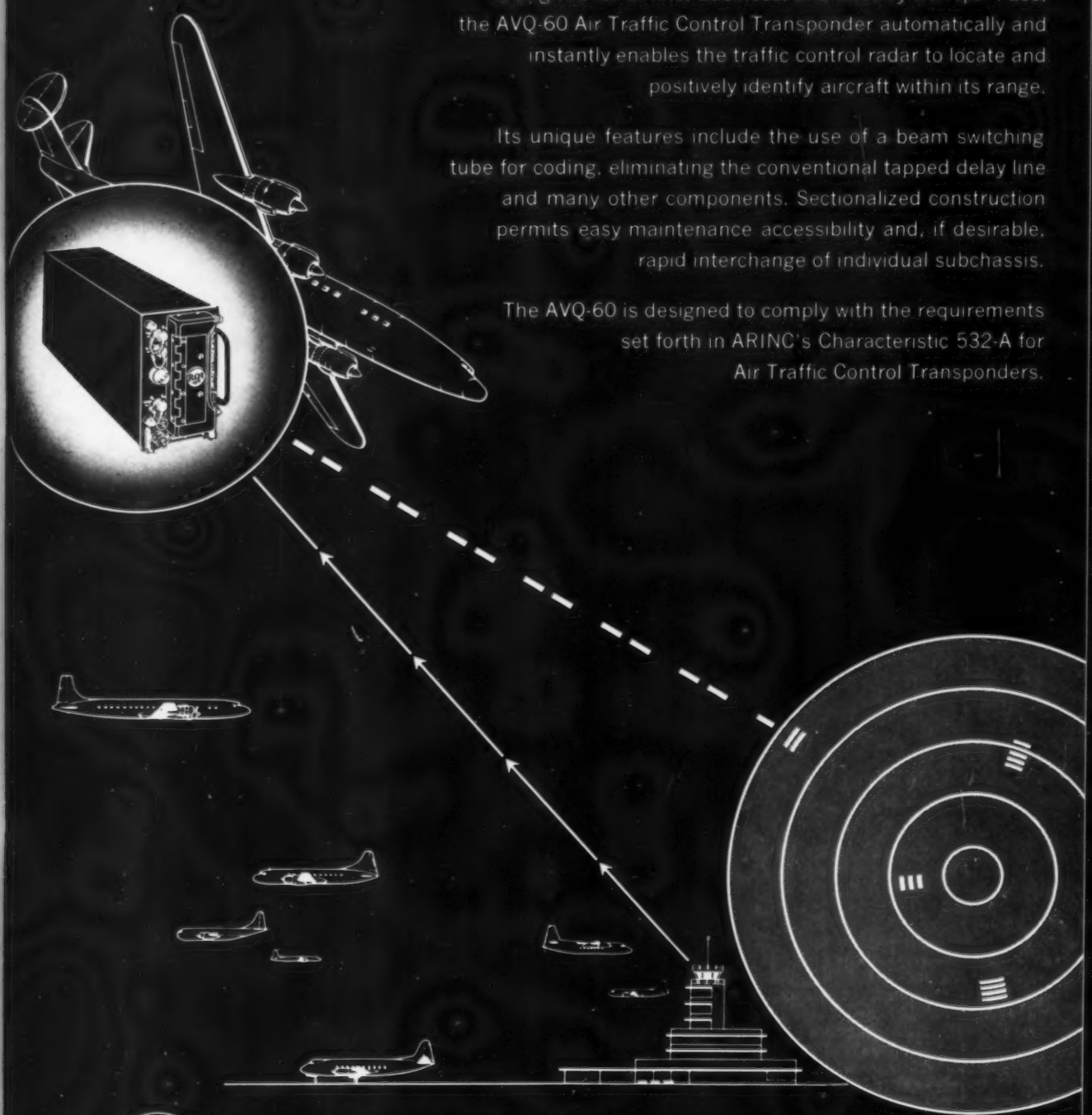
The AVQ-60 is designed to comply with the requirements set forth in ARINC's Characteristic 532-A for Air Traffic Control Transponders.



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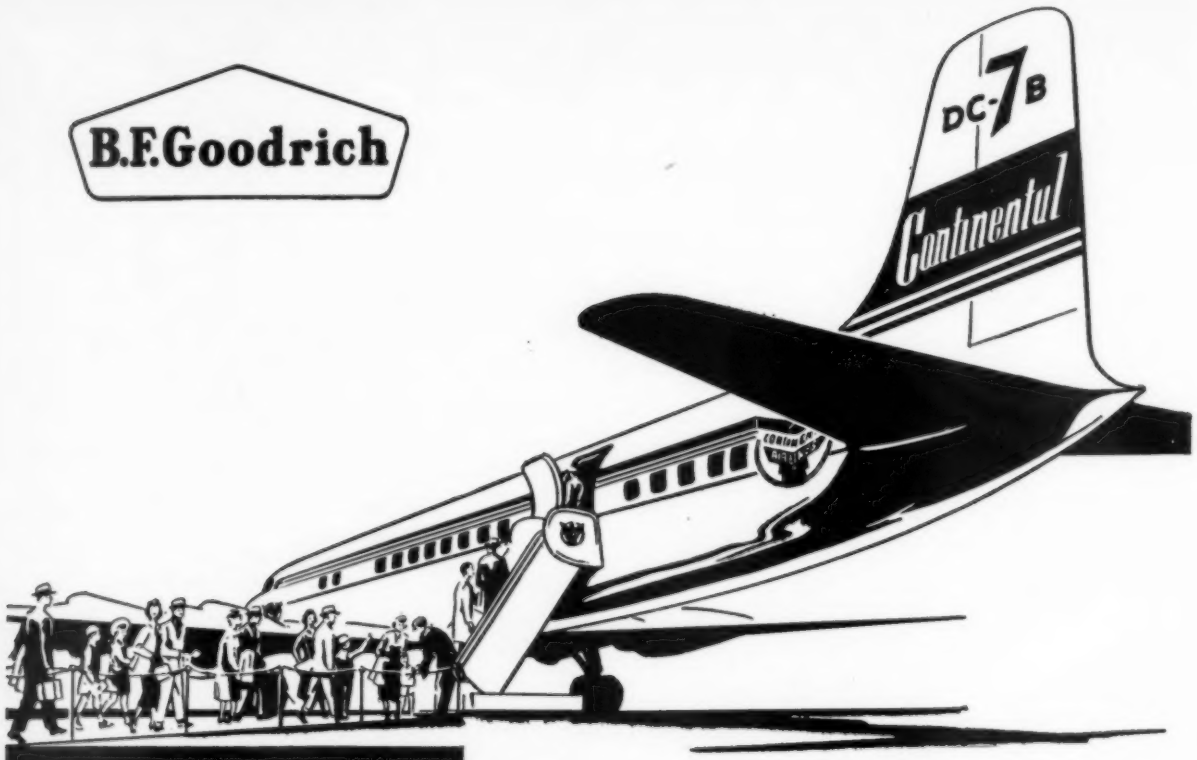

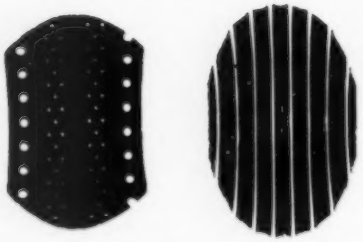

Compact, rectangular tread pattern of BFG Dimpled Tire (above left) gives average of 10% more landings than ribbed design of same size.

Dimpled tread gives 10% more landings than ordinary ribbed tread

B. F. Goodrich Dimpled Tires have been selected by Continental Air Lines for their DC-7B's flying new routes between Chicago, Denver and Los Angeles. These tires are designed to put more tread rubber to work, to spread the load more evenly from shoulder to shoulder. An over-all improvement in tread profile takes some of the load off the crown of the tire, where wear is ordinarily most severe, and distributes that weight more evenly over a broad compact footprint (see lower left).

The cup-like indentations also contribute to the extra wear of B. F. Goodrich Dimpled Tires. Because the rubber around these dimples is compressed under load, the tread is more stable and resists cutting. The result is more payload trips before tires have to be removed —landings at lower cost.

The first high-pressure Tubeless Tire, first Tubeless to land at 300 mph, and now the Dimpled Tire—all represent continuing leadership of B. F. Goodrich Aviation Products. Whether you are interested in luxury fleets, business planes or military jet aircraft, B. F. Goodrich has a complete line of tires to meet every requirement.

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MAY 6, 1957—VOL. 20, NO. 25

AMERICAN AVIATION

WORLD'S LARGEST AVIATION PUBLISHERS

Navy charts its future . . .

Better combat aircraft, new seaplane family planned; missiles won't completely replace manned aircraft

by Lois C. Philmus

NAVY'S AIRCRAFT AND MISSILE PROGRAM is blueprinted to fit the architecture of the services "triple-threat" structure: carrier forces, missile-launching submarines and seaplanes. Building blocks: advanced combat aircraft, a new seaplane family, specialized missiles.

Both the fiscal 1958 procurement and future development programs are geared to a Navy conviction that guided missiles will not completely replace manned aircraft anytime in the foreseeable future. Navy generally views the missile as an additional, rather than a substitute weapon.

In an exclusive interview with AMERICAN AVIATION, Vice Adm. William V. Davis, Jr. declared: "We must be most careful in comparing weapons characterized by technical uncertainties with weapons we can project forward with considerable certainty, such as our new aircraft. There is also the necessity of maintaining non-nuclear capability for small wars."

The Deputy Chief of Naval Operations for Air said that eventually it might be advantageous to use missiles in place of aircraft for long-range atomic weapons strikes, but added that it is too early to be sure. However, he noted, the Navy is sure that it can accurately deliver atomic weapons with its manned aircraft.

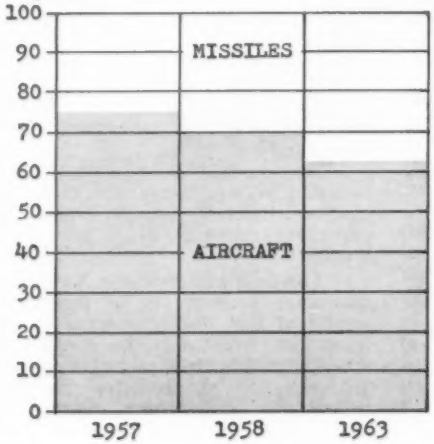
"We are able to hit our targets under the most difficult conditions of weather," he declared. "In time, missiles should be able to do this job with greater security, perhaps as accurately, but this could be a long time off."

Admiral Davis revealed that when Talos and Terrier surface-to-air missiles are available in "sufficient" number in the fleet, the Navy can operate fewer interceptors. "How quickly we reduce the number of interceptors depends on how quickly we can get guided-missile ships," he said.

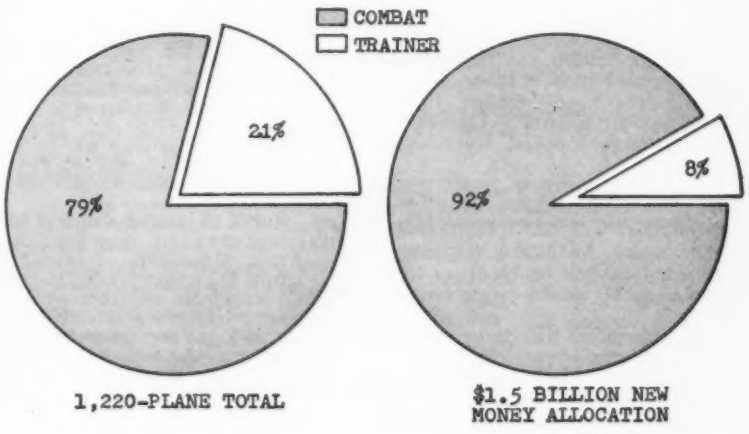
Actually, the long-range Talos, threatening the life of the manned interceptor, is forcing the Navy into extending the range of its interceptors. The fact of its entry into fleet service, Admiral Davis acknowledged, has already affected fighter design. "Our newer interceptors are capable of staying aloft longer than heretofore. The role of these interceptors in fleet air defense is in the outer perimeters beyond the missile area—perhaps 75 to 400 miles out."

(The overall missile philosophy was spelled out by Rear Adm. John E. Clark, Navy missile director, in a recent speech: "The guided missile for many years to come will be in a complementary rather than a supplanting role. . . . The large surface-to-surface missiles are nuclear war weapons and the Navy has no intention of being mousetrapped into relying entirely on any weapons systems that restrict it from being able to fight any kind of war. Missiles do some things far better and under some circumstances are the only way to do it but they are limited in versatility and to eliminate entirely

NAVY AIRCRAFT/MISSILE PROCUREMENT RATIOS



FISCAL 1958 PROCUREMENT FOR AIRCRAFT



the human being with his ability to exercise judgment on the spot would be to build in a rigidity that would leave us vulnerable in many areas.")

In this light, the Navy's aircraft-to-missile procurement ratio is rising more conservatively than that of the Air Force. While the USAF estimates a 50-50 balance in about five years, the Navy expects to spend 60 to 65% of its procurement dollar for aircraft and 35 to 40% for missiles. Currently, Navy funding is 75% for aircraft and 25% for missiles, with the fiscal 1958 program geared to a 70%-30% ratio.

Navy's fiscal 1958 shopping list of 1,220 aircraft is for 79% or 964 combat aircraft and 21% or 256 jet trainers. No transports will be procured. Majority of the combat aircraft will be fighters and attack, but also include helicopters, early warning, patrol, land and seaplanes and Marine observation aircraft. The combat aircraft, significantly, gobble up 92% of the procurement dollars to the jet trainer's 8%.

Reductions: there's a limit

Closely interwoven into procurement plans is the Navy objective of reducing the number of basic models in its inventory. During the past year, this was whittled down from 77 to 60. Number of models in the Fleet Fighter squadrons will be shaved down from nine to five in about two and a half years.

But, Admiral Davis cautioned, "There is a limit to the amount we can reduce. We estimate that in order to perform the major functions of the Navy we must have at least 24 classes of aircraft (i.e., all-weather fighters, heavy and light attack, carrier-based AEW, photographs and Hunter-Killer ASW.)

"If we have a new model of each phasing in, and an older model phasing out, this will make 48 models in our inventory. Additional functions for specialized aircraft brings it up to between 55 to 60 models unless functions change."

Here's how the Navy program shapes up:

FIGHTERS: The Navy will no longer support day-fighters. All future aircraft must have *complete* all-weather capability, Admiral Davis asserted. Presently, the Chance Vought F8U-3 is the scheduled follow-on to the F8U-1. Although an entirely new airplane, it will take advantage of the growth capability of its predecessor. The McDonnell F4H will be brought along as a back-up. But it will be one or the other, not both.

The F4H will test a slightly different concept, since it is a twin-engine configuration. The F8U-3 will have a single Pratt & Whitney J75 engine and the F4H, two General Electric J-79s. Navy will thus have a choice of two powerplants in its evaluation of the two approaches.

Navy is concerned over the constantly increasing weight of the advanced fighters. Officials are wondering to what extent it should devote the striking power of carriers to purely defensive operations. Some critics have challenged the carrier concept because of this. It is felt that carriers will be so busy defending themselves, they will be impotent in attack capability.

ATTACK: North American A3J is in design stage as replacement to the present Douglas A3D. Douglas A4D, a lighter, lower altitude performer, will be its own back up. The "growth" model is designated the A4D-3 and will be powered by a Pratt & Whitney J52.

Navy currently is drafting a requirement for a good, low altitude attack plane that may utilize turboprop engines (see box).

SEAPLANES: Seamaster No. 3 will fly in the fall. Navy is certain that a proper fix has been found. The failure was aerodynamic, not structural, Admiral Davis explained. The tail is now under redesign. The first two ill-fated Martin P6Ms accumulated 80 hours. Some of the time will be reflown out of caution, but most of the data will be applied to the resumed test program.

In its nuclear program, the Navy is shooting for endurance rather than high performance. Reports indicate that the nuclear seaplane lends itself admirably to the 90-megawatt reactor that is now believed feasible and within limits of shielding abilities. Possible applications are foreseen for ASW, AEW, and transport operation where almost unlimited endurance would be a premium.

However, the admiral cautioned, only preliminary design studies have been done. "A considerable amount of additional research and development is required prior to attempting production of even a prototype of this revolutionary type aircraft."

A successor to the Martin P5M will be in service in four to five years. A manufacturer, reportedly Convair, recently won a competition for a new ASW seaplane to fill the requirement. However, a contract has not been finalized.

Design requirements now are under negotiation. Generally, the new ASW will have features to operate in very rough water. It will be designed for repeated landings in high states, accomplish sonar echo ranging and then fly off for a few miles to repeat the process.

MISSILES: Immediate followup to the Chance Vought Regulus I is the recently unveiled Regulus II. Third generation of submarine-launched long-range surface-to-surface missile is already on the boards. Tentatively named the *Triton*, it is a twin-ramjet configuration. McDonnell Aircraft Co. is prime contractor.

Although there is no change in the top priority of the Navy's Polaris ballistic missile program, renewed emphasis on long range non-ballistic missiles is evident.

Admiral Clark emphasized that attention to long-range ramjets must continue. Inherent guidance capabilities apparently outweigh lesser speed and altitude.

The final guidance, the Navy missile chief declared, is so immensely important that one is inclined to believe that, even with the missiles of the future, a form of supplemental guidance will be necessary. He cautioned that, despite the potential of the ballistic missile, there are still

R&D priority system: Navy style

In establishing relative priorities for new and continuing programs, Navy gives major consideration to:

1. Programs that fill deficiencies in combat potential.
2. Development due for completion and early entry into the fleet.
3. Programs that will benefit from R&D efforts of the USAF and Army.

Fiscal 1958 program is sound as it now stands. Specific R&D requests of $500 million coupled with procurement money will fill naval aviation requirements. But, if Congress reduces procurement requests, certain programs will be slowed down or "reoriented."

Navy's budgetary limits for R&D from 1946-1950 hurt more than later limitations. In 1950-1955, aviation R&D gave No. 1 priority to atomic attack capabilities. Starting in 1956, sufficient funds were available to emphase other areas to greater extent. The 1958 program has undergone continual revision to place funds in most profitable area. Programs killed: jet utility competitions.

Navy program for Marine aviation

AIRCRAFT: About 15% of the total operating program is assigned to the Marines, including: 29% of the combat category; 25% of the VF and VA carrier types; 48% of the helicopters; and 100% of the fixed-wing liaison observation types. New aircraft will be assigned at the same percentages.

Numbers of aircraft will be kept at present level. Marines will get more helicopters but at the sacrifice of some fixed-wing planes.

MISSILES: Marine Corps is full participating partner in Navy's air-launched programs. About 40% of overall air-to-air missile requirement is for Marine Aviation. Sidewinder enhances Marine aircraft effectiveness to defend beachhead and is packaged for rough handling and field stowage. Air-to-surface missiles designed with Marine close-support requirements in mind.

many problems to overcome before it can be looked upon as a "weapon of precision."

TRAINERS: Introduction of swept-wing, transonic aircraft into fleet service has brought about a major change in Navy's advanced trainer procurement program. Fewer Lockheed T2V trainers will be procured in favor of additional Grumman F9F-8T Cougars. While the T2V was originally procured for advanced training, it has been found necessary to provide both advanced and fleet transitional training in an aircraft closer to operational types. The F9F-8T will be placed both in the Naval Air Training Command and in the fleet for special transition training. The T2V will be assigned to NATC for early advanced training only.

Basic training in the Navy's new jet trainer now under development by North American Aviation, Inc. is expected to start sometime in 1959. The T2J will be procured in substantial quantities, phasing out the piston SNJ.

Future of the Temco TT-1 in NATC depends on the outcome of a special evaluation. It will dictate how far down in the training pipeline jet aircraft can be utilized. The intensive "pilot" tests will help decide whether anything can be gained by jet primary training or whether the same goal can still be accomplished in less-expensive propeller types.

At best, Navy transition to all jet training will be an evolutionary process, Admiral Davis said. Present requirement is 150 hours of jets opposed to 25 hours just a few years ago. Experience of the Canadians, French and current efforts of British and USAF has indicated, however, that it is a field that should be closely investigated.

HELICOPTERS: About $120 million or 8% of the fiscal 1958 aircraft procurement budget is for rotary-wing aircraft. Next step in development is a general shift to turbine powerplants for a reduction in size and weight or, at least, increased performance.

Current Navy-sponsored developments include a contract to Kaman Aircraft Corp. for a 7,000 lb. turbine-powered utility helicopter. Contracts also have been let for: remote controlled helicopters; studies for converting current ASW and assault copters to turbine configuration; one-man machines, and general R&D for support of naval rotary-wing aircraft capability.

TRANSPORTS: Navy has increasing interest in developing and buying a larger carrier-on-board delivery aircraft. Intensive study is under way for design requirements of a new COD aircraft.

Conventional transport procurement will be restricted in future years to replacement of the 30 cargo and passenger aircraft retained by the Atlantic and Pacific Fleets. Under the single manager airlift assignment to the Air Force, the Navy turned over about 15 of its transports. Further conventional transport will be procured from USAF developments.

Navy appears to have a tight, effective program. However, the programmed 1,220 aircraft are below the formula for replacement. Admiral Davis estimated that there would be an average of 2,000 replacement aircraft for an inventory of 10,000 aircraft. Current inventory is about 11,000 airplanes.

Navy estimates that combat types have a first-line life of three years; support types, five to ten years, and transports, ten years and more. Procurement and development programs are based on these estimates, coupled with the five to eight years for developing new equipment.

Wanted: low-altitude attack plane

Navy requires no supersonic capability on deck, but dash capability is mandatory. Must have more range, more endurance.

May go for a turboprop or turbofan engine with by-pass arrangement for low-fuel consumption with high subsonic speeds. Must carry good navigating equipment. Requirement is a throw-back to the A2D counter-rotating SkyShark. Probably will be twin-engine.

Manufacturers answering invitation include: Lockheed, Boeing, Grumman, Douglas, McDonnell, Chance Vought and North American.

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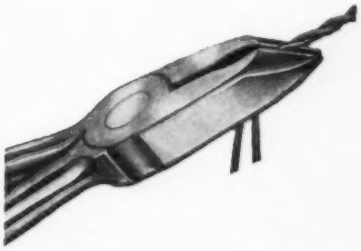

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Renegotiation: industry wants action by Congress

Obsolete law, arbitrary rulings still taking millions from past earnings

A THOROUGH CONGRESSIONAL STUDY of the effects of renegotiation on the efficiency and morale of defense industries is urged as the way to necessary reforms.

Management changes within the Defense Department make it timely to seek new policies in that quarter also.

More aircraft companies are suing in the U.S. Tax Court for the return of millions taken from 1953 profits only now being reviewed. But not an aircraft case from prior years is yet decided.

There can be no cure without the help of Congress. Lawmakers who really know the problem are sympathetic.

Restudy sought

Last year's report of the Hebert Committee investigation of aircraft profits came to the support of defense contractors as follows:

"Planning is important in an art which is progressing as fast as aerodynamics and all of its counterparts. Vast sums are being expended in design competition and technical research.

"To have statutory renegotiation impending for long periods is, in our opinion, a serious handicap to the progress of the industry as an arm of national defense.

"We believe Congress must immediately initiate a restudy not of the principle of recovering excessive profits but of the application of the statutes and the regulations and conduct of the Board itself."

As the committee turns to the engine and electronic phases of aircraft production, these findings may well be reinforced. The Armed Services Committee, however, can only suggest the desired action which is in the province of the Ways and Means Committee.

The Renegotiation Board wants it to appear that no study is needed after last year's quickie review by the Joint Committee on Internal Revenue Taxation, tied in with Ways and Means and with the Senate Finance Committee.

This was not an open-door inquiry, though industry and government people talked. After that, the bill to renew the Renegotiation Act to the end of 1958 was passed without hearings. Some amendments were developed in the Joint Committee sessions, especially the exemption for "standard commercial articles and services."

Until recently, Congressmen did not seem to be aware that any further steps were needed. But William M. Allen, president of Boeing, worst hit thus far among the airframe companies, has declared that it is time for Congress to take another look.

Allen said he doubted that Congress intends to take money arbitrarily, but if it does, there are simpler ways of doing it.

In tax court

Boeing, already in Tax Court for the $9.8-million bite into its 1952 earnings, plans to sue also for the excess recently found for 1953—another $7.3 million or a net payment more than $2 million, after tax credits.

Other than Boeing, only three aircraft companies thus far have risked this appeal, having no precedents to show whether the Court is more likely to give a refund or take a deeper bite.

These are the Grumman Aircraft Engineering Corp., Temco Aircraft Corp. and Fletcher Aviation Corp. The latter withdrew its suit.

Douglas Aircraft Co. now has heard the bad news for 1953 and will sue. For once, the Renegotiation Board scaled down the finding of its local board from $9 million to $6 million, or a net refund of $1.3 million which Douglas has to pay now in cash.

Most companies are reticent in complaining about a Board that can clip them at will. But 1956 annual reports, recently issued, indicate a stiffening of resistance.

The Martin Co., badly hooked for 1953, will "take action." The amount set by the Board is not yet known but the regional board wanted $4 million, a net refund of $1.7 million.

Little has been heard from the engine companies, which probably have not suffered as much . . . yet. The annual report of Curtiss-Wright Corp. states that profits through 1952 have been cleared by the Board and that the regional board has recommended clearance for 1953 and 1954.

Believing that its profits are not excessive, the company has made no provision for refunds after 1952. Some others are in the same position.

But no one can be sure. Key producers remain vulnerable until the Board decides, three or four years later.

Industry people foresee some acceleration of aircraft cases before the hearings of the Hebert Committee in June. The Renegotiation Board was criticized last year for being so far behind.

Pressure of inquiries by the Board and its regional offices, and more profit-remand announcements can make renegotiation more and more an issue in the weeks ahead.

Appropriation hearings last January revealed that $78 million of excessive profit determination was then in process, no doubt including much aircraft money.

The refunds are mainly from big companies. In prior years, nearly 90% came from contracts over $1 million. Now that the law no longer applies to contracts below that amount, the Board's work load is a little less.

So the budget for the coming fiscal year was cut to $3.4 million, or $275,000 less than the year before. The House chopped further to a flat $3 million. The Board asked in the Senate to get the full amount restored, because the cut is out of proportion to the reduction in work and a big backlog of cases remains.

In both House and Senate hearings, the Board was praised for recovering so much money for Uncle Sam. These sets of legislators heard only the Board's version of what goes on and not the industry's.

Board is secretive

Thomas Coggeshall, chairman of the Renegotiation Board, is a mild-appearing white-haired gentleman who spent his life in banking and import-export work, both in the U.S. and abroad.

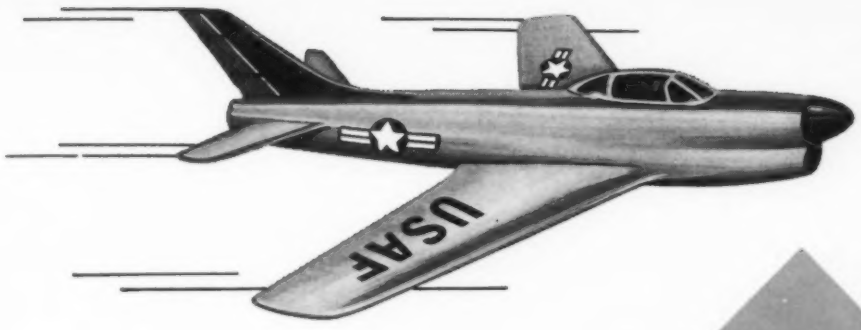
His office is in one of the temporary buildings along the Mall in Washington, a relic of the late war, like the Renegotiation Act itself. Call there for press information and no one can tell you anything except the chairman who will discourse pleasantly, in Harvard accents.

You will depart with no more

Plant and product improvement slowed

An arbitrary Renegotiation Board under an obsolete law is weakening defense industries by demanding billions that otherwise could be spent for plant and product improvement.

This is the second special article to show how the Government is robbing itself.



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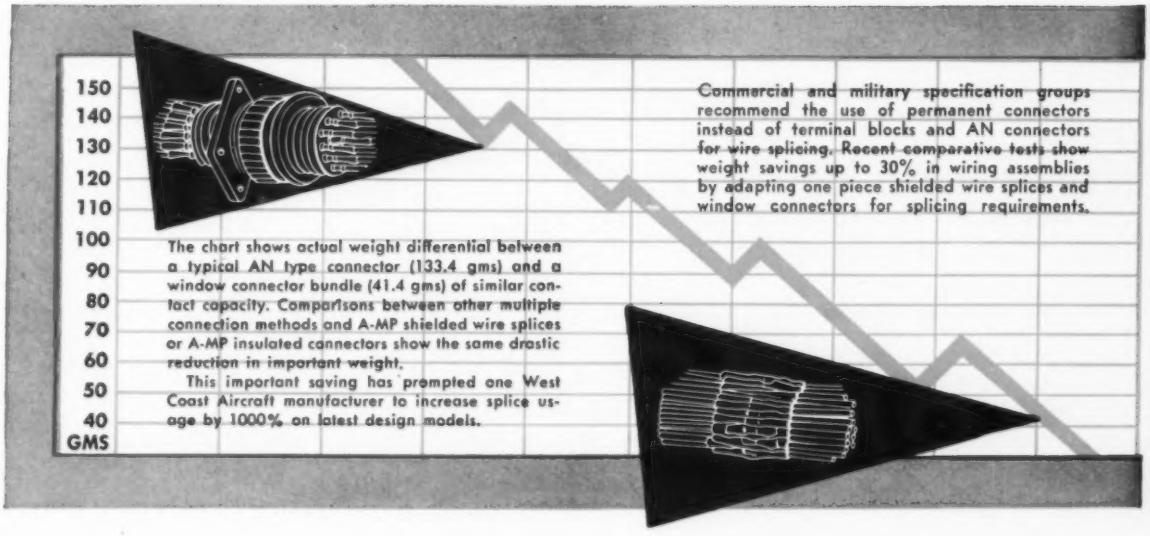

The chart shows actual weight differential between a typical AN type connector (133.4 gms) and a window connector bundle (41.4 gms) of similar contact capacity. Comparisons between other multiple connection methods and A-MP shielded wire splices or A-MP insulated connectors show the same drastic reduction in important weight.

This important saving has prompted one West Coast Aircraft manufacturer to increase splice usage by 1000% on latest design models.

Commercial and military specification groups recommend the use of permanent connectors instead of terminal blocks and AN connectors for wire splicing. Recent comparative tests show weight savings up to 30% in wiring assemblies by adapting one piece shielded wire splices and window connectors for splicing requirements.

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Circle No. 11 on Reader Service Card.

facts than can be read in the hearings when Coggeshall talked in Congressional committee rooms.

There was not even an annual report until 1956, and then on condition that only general data would be included. The gross total of recoveries through 1956 has been stated as $1 billion, about half from renegotiation and half from "voluntary refunds and price reductions disclosed in the course of renegotiation proceedings."

Nobody seems to know even approximately how much was a net return to the Treasury after allowance for federal and state taxes already paid on gross earnings prior to renegotiation.

Figures are not given for individual companies, unless they make their own announcements, and not even for branches of service or for the various major industry classifications. Such a comparison would show whether some industries are being hurt percentagewise more than others.

As it dissects the earnings of individual companies in closed proceedings, the Board closes all possible openings to any challenge of its general policies or even any clue to what they are.

No precedents followed

While a court or quasi-judicial body works to develop a framework of consistent policies as an orderly pattern for the guidance of all concerned, the renegotiators seem to be fancy free.

The Hebert Committee report makes this startling observation:

"We are concerned with the Renegotiation Board regulations which provide that their prior actions are not 'controlling precedents' and the 'formula of an overall evaluation.'

"Why these factors are not capable of explanation has not been satisfactorily answered, as far as we are concerned."

When a federal agency with great powers over defense industries is unaccountable even to Congress, a searching investigation is due and in this case it is overdue.—K. K. H.

B-52 stretchout, ordered by USAF, draws blast from Sen. Jackson

by Henry T. Simmons

Air Force has ordered a stretchout in the production of Boeing B-52 bombers and a corresponding reduction in the delivery rate for the company's KC-135 jet tanker.

Air Force Secretary Donald Quarles said production of the eight-jet bomber will level off at its present rate of 15 a month instead of climbing to the planned target of 20 a month. Output of the tanker will be held at a rate of 15 a month when this pace is reached some time next year instead of climbing to the old target of 20 a month.

The action will not reduce the Air Force's program to procure a total of 603 of the big bombers for its Strategic Air Command, although it will delay completion of the force until late in 1959, some six months after the original completion date.

Quarles estimated that the Air Force will have received about 380 B-52s from Boeing by the end of fiscal 1958 (June 30)—some 60 aircraft less than originally planned. This means the airmen will have about seven operational wings of B-52s at that time instead of the eight previously forecast by Quarles.

Factors in stretchout

Three principal factors led to the B-52 stretchout:

Lower rate of production will permit procurement of larger numbers of a more advanced, "wet-wing" B-52 capable of carrying greater fuel loads.

Previous production goal—20 a month—was too great in relation to the size of the B-52 program.

Encouraging progress in preliminary flight tests of the Convair supersonic B-58.

Sen. Henry Jackson (D-Wash.) promptly blasted the Quarles decision, charging that the Air Force really plans to place a production order for the rival Convair B-58.

"The real importance of the announcement is that the Air Force does not plan to order more than 603 B-52s," he declared. He also criticized the stretchout of the KC-135, noting that the Air Force has a substantial shortage of tankers to refuel all of its big bombers as well as a whole family of tactical aircraft.

At a press conference following the Quarles announcement, Defense Secretary Charles Wilson said the B-58 will continue to receive development support during fiscal 1958 and that a production order for the bomber may be issued in fiscal 1959.

It was learned that the Air Force expects to order 18 more B-58 test models next fiscal year on top of the 13 now scheduled for delivery. Total cost of the B-58 development program through fiscal 1958 may hit $750 million, including $300 million for the 18 additional bombers.

Role not yet clear

Exact role of the B-58 in the Air Force's future inventory is not quite clear. It is generally agreed that the B-58 is bound to replace SAC's Boeing B-47s, but Convair and some Air Force officials believe the Hustler can also perform some of the shorter-range missions now reserved for the B-52. However, many other Air Force officials are apprehensive about the range limitations of the aircraft and its alleged requirement for frequent refueling. Volume production of the B-58 is still some years off, so there is no immediate need for a decision on the question.

In a letter to Sen. Jackson explaining the B-52 stretch-out, Quarles laid great stress on the prospect of getting larger numbers of model-improved versions of the B-52 under the new schedule. The so-called wet-wing bomber will presumably have substantially greater range than the current model.

Delivery of the improved B-52 "is highly desirable since the performance of this airplane will be substantially increased and other design changes are being made which greatly improve the penetration ability of this airplane to reach and strike heavily defended areas," Quarles said.

"Since the earliest date for obtaining delivery of the model-improved airplane is sometime next year, only two wings of the planned 11-wing force could be equipped with the improved B-52s under the 20-per-month production plan," he wrote. "By leveling production at 15 per month, a total of three wings can be equipped with the later aircraft."

Three companies receive helicopter study contracts

Three of the five Army design study contracts for a two-place observation helicopter have been placed.

Doman Helicopters, Inc., Bell Aircraft Corp., and Kellett Aircraft Corp. have received contracts. The remaining two will be selected from three firms—Hiller Helicopters, Gyrodyne Co. of America and Nagler Helicopter Co.

Contracts call for a four-month engineering and feasibility study for a helicopter to be used by Army in the 10 years beginning 1960. Army will evaluate reports to see if military vehicle can be produced at reasonable cost before going any further.

J47 operates at temperatures in excess of 1,600°F

General Electric Co. has been operating a "Hot Rod" version of the J47 engine for more than two years at turbine inlet temperatures "greatly in excess of 1,600°F."

GE said the Hot Rod uses a special high-delivery fuel system, a cooling system, coated molybdenum turbine blades and other design and material changes necessary to withstand ultra-high turbine temperatures. Hot Rod has been used to test cermets and castings at great temperatures.

Industry seeks clues on what new-look foreign aid policy will mean to aviation

by Charles Schaeffer

THE ADMINISTRATION this week is dressing up its new-look foreign aid program for an official debut about May 15 on Capitol Hill. With sentiment running high for sharper budget cuts, the President's $4.4-billion request is a vulnerable target—a fact not unknown to Mr. Eisenhower, who recently told Congress it could safely trim $500 million from new military spending authority.

Pentagon officials and those close to the White House declined to specify what hardware the $2,450,000,000 military aid portion of the 1958 request would buy. But it was reasonably certain some $500 million of the funds would be earmarked for advanced weapons and missiles, paralleling 1957 requests.

In its original bid last year, the Budget Bureau tabbed $530 million for this category. Final figures are closely guarded, but informed sources say the amount approved was in the area of half a billion dollars.

The aviation industry this year will also be eyeing the *revamped* assistance plan, perhaps vainly, for a glimmer of how the Administration intends to carry out its missile aid plan to NATO countries. Only sketchy highlights are known.

Major foreign aid reforms have been unfolded to a special Senate Committee by Secretary of State John Foster Dulles. One would continue direct military aid at present levels of from $2.2 billion to $2.5 billion yearly. Another redefines "defense support" to include all economic aid that makes it possible for recipient nations to maintain their defense establishments.

Under the plan, all military aid and defense support money would be transferred to the Department of Defense budget. It would put military aid on a permanent, long-range basis, making annual Congressional authorizations unnecessary.

Although a special Senate Committee favored the split-budget approach, influential Congressional leaders have sounded objections. New Hampshire Republican Styles Bridges and Rep. Clarence Cannon, Democratic chairman of the Appropriations Committee, disclosed intentions to resist the proposal.

Whatever happens to foreign aid this year, it never once suffered from a lack of discussion. The Special Senate Committee to Study Foreign Aid heard reams of testimony, dug into mountains of records. Headed by veteran Rhode Island Democrat Theodore Green, the committee released 21 reports, some of them prepared by groups with a direct interest at stake.

Generally, private research institutions favored continuation of some form of foreign assistance. But they worried over phases of the defense aid program that were not working well after seven years. Systems Analysis, Inc., Washington, D. C., backstopped by a panel of retired high military men, tabbed "lead time" as a key trouble area in the foreign assistance program.

The report recommended that Congress:

Urge correlation of lead-time factors with the realities of mutual defense assistance requirements.

Consider appropriating funds on other than a year-to-year basis, possibly set up a revolving fund.

Launch a detailed study to decide whether maintaining or replacing old items is more economical.

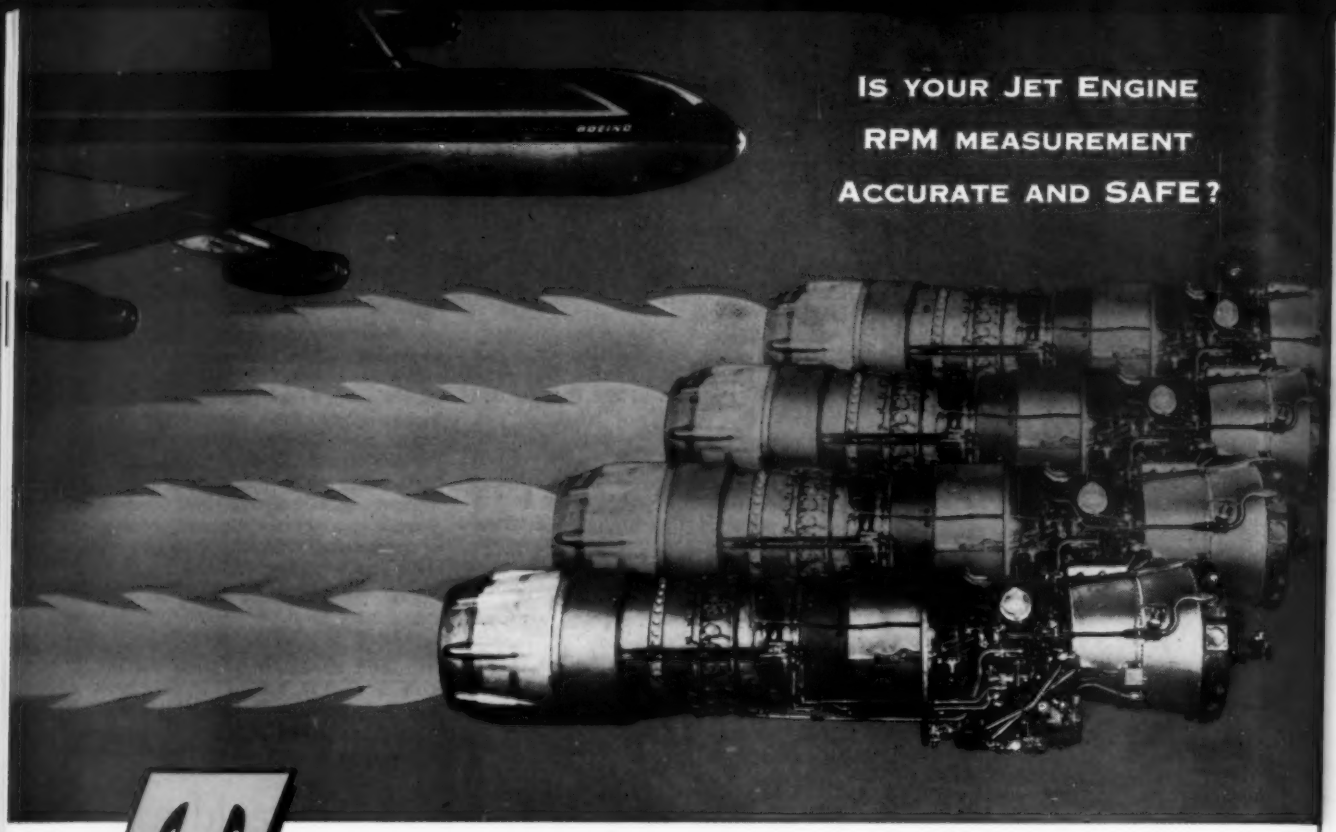
Systems Analysis, Inc., broke down some $16 billion in military aid purchases through 1955 this way: (1) 40,000 tanks and other combat vehicles; (2) 1,200 naval craft of all types; (3) 44,000 artillery pieces of various types; (4) 7,000 aircraft, 50% of which are jet-propelled; (5) two million small arms and automatic weapons, and (6) billions of rounds of ammunition.

Allied air forces, the report estimated, totaled more than 300 squadrons, incorporating 6,000 aircraft concentrated in NATO nations.

The impact of foreign aid on the U.S. economy served as the basis of a detailed study of the National Planning Association. It found that military aid accounted for 8.8% of the total

French fighter undergoes flight tests

FRANCE'S LATEST LIGHTWEIGHT FIGHTER, the Breguet 1100, is now undergoing flight trials. Powerplants are two Turbomeca Gabizos developing 2,400 lbs. static thrust each.



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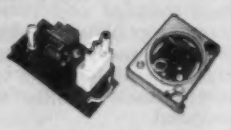

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production of the aircraft engines and parts industry in 1955 and was edging up to the Korean War level.

Some 77,000 U.S. jobs, the report observed, could be tied to overseas' shipments of aircraft engines and parts in the same year. Labor shortages in the aircraft industry are mirrored by foreign aid needs, the report also found.

Foreign airports improved

NPA concluded, however, that domestic air transportation benefits little from the foreign aid program. Total amounts expended in personnel movements amount to less than $10 million.

"Probably the greatest contribution made by the International Cooperation Administration and its predecessors, the Export-Import Bank, and similar agencies, has been in improving airports and other airline facilities abroad," the report said. "American carriers have benefited from such improvements."

Because small amounts of commercial air transportation have been used in handling foreign aid commodities, even a large change in foreign aid would affect the industry only slightly, NPA said.

The report noted that the plan to put MATS on a revolving-fund basis, followed by a re-evaluation of domestic participation in defense transport activities, could alter the picture.

"However, it is unlikely that foreign aid shipments abroad, whether military or civilian, will be a major or even serious contributor to the American air transportation industry within the next ten years, unless strategic considerations necessitate drastic changes in methods of transportation," the report declared.

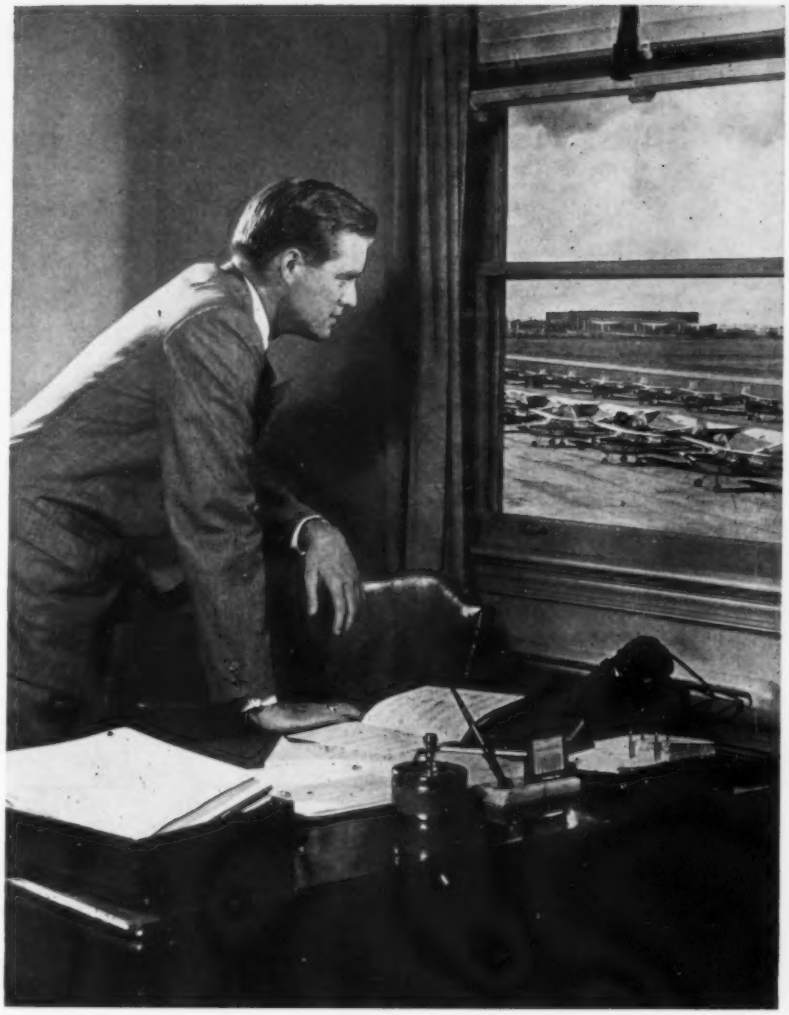
Australia to build fighter equivalent to F-104

The Australian government will build a supersonic fighter with performance equivalent to that of the Lockheed F-104 Starfighter.

Australia will buy 33 F-104s and it is expected that the United States will supply jigs, machines, personnel and technical know-how to help Australian aircraft plants manufacture the equivalent fighters.

It's official now: The Martin Company

Stockholders of The Glenn L. Martin Company have voted to change the firm's corporate name to The Martin Company "in keeping with industry's growing recognition of the greater impact of foreshortening company names." The shorter name has been in use for some time in company announcements, directories, etc.



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New anti-collision lights win pilots' favor

White strobe light system, invented by H. W. Atkins, gets general approval in Washington demonstration

by William O'Donnell

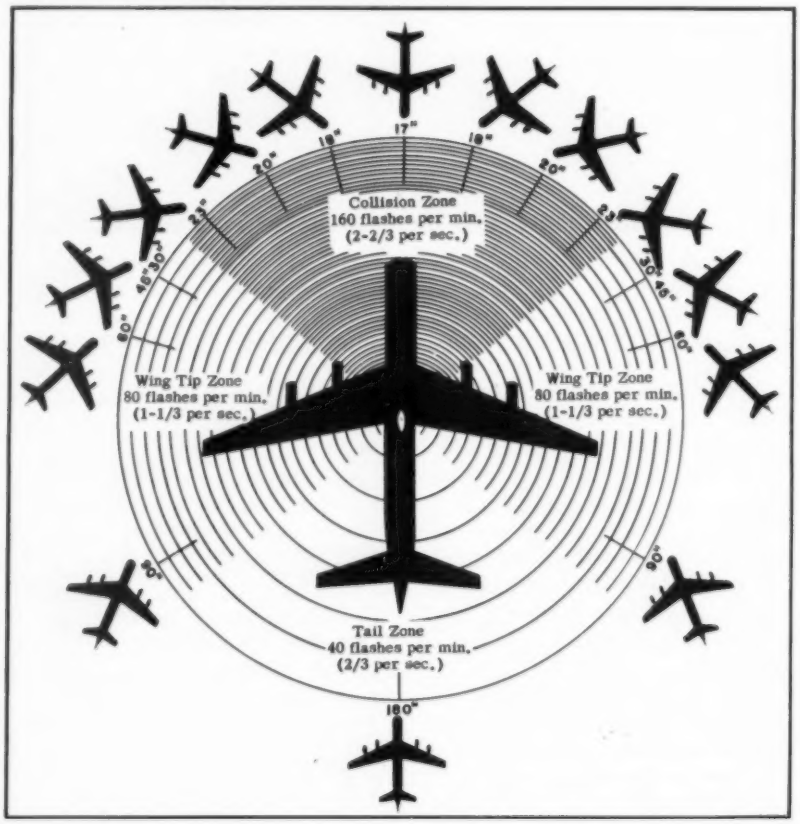
A new concept in aircraft exterior lighting, formally flight-demonstrated for the first time in Washington, D. C., appears to be gaining favor among air safety officials.

The light, invention of Northwest Airlines Pilot H. William Atkins, is a departure from conventional aircraft relative danger lights in that it is white and gives positive directional indication. Atkins says that it can be adapted for use on all type aircraft from light planes to jet transports.

The group that attended the Washington demonstration included airline and private pilots, military and Civil Aeronautics Administration representatives. All were openly enthusiastic as to the light's potential. Previously, some 160 airline pilots who had observed the device in informal demonstrations were unanimous in their approval, Atkins said.

Basically, the Atkins light uses a combination of three flashing Xenon condenser discharge strobe units. One light flashes forward, another to the side and another to the rear. The forward-facing lamp flashes 160 times a minute, the side 80 and the rear 40.

Average closure times for aircraft on collision courses from various angles (time in seconds)



ACTION REQUIRED—Collision zone: Less than 30 seconds, take immediate action. Wing tip zone: Approximately 1 minute, watch for the change and start evasive action. Tail zone: One to three minutes, registry of aircraft going in your same direction. No immediate action necessary.

The differential in flashing time allows a pilot of another aircraft to determine the direction of flight of the plane and its relative position. The blue-white flash is similar in color and intensity to an electric welder or a trolley-wire flash. Each flash is of 1/1,000 sec. duration and, despite its intensity, does not spoil the pilot's darkness adaptation nor is halation pronounced.

Atkins explained that the white light was selected purposely. He said the condenser discharge light has a color temperature of 7,100° Kelvin, greater than daylight. The full color spectrum of the light contains the entire rainbow. Whatever color is best for penetration of a particular type fog or haze is available.

"Besides," Atkins said, "white light can be seen off to the side of the eye better than red. Red light is visible through an arc of from 30° on one side to 45° on the other, while the white can be detected from more than 60° on one side of the eye to more than 90° on the other."

Atkins also expressed the opinion that red is used too much and cannot be seen over great distances. He said that the strobe light can be seen three times as far as conventional lights under all conditions.

Models demonstrated at Washington were mounted in two configurations. One system had lights on the top and bottom of the fuselage of a General Mills DC-3 and the other had installations at the wingtips. Each system was operated independently and then together.

The fuselage-mounted units had four lamps each—one forward, one to each side and one aft. The wingtip versions had three lights in each unit —forward, one side and a rear.

The DC-3 operated the lights over the lights of Washington and nearby Virginia. Other aircraft-carrying observers made passes from many angles and compared the flashing lights with city lights, stars and other aircraft safety lights.

Observers reported that the lights were effective in both configurations but that the wingtip version seemed to give better indication of the aircraft's size. Passengers in the DC-3 also reported a preference for the wing-mounted system because the fuselage

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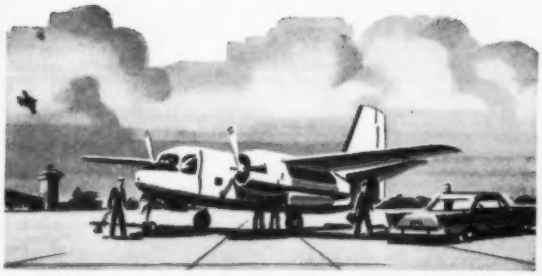

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lights reflected off the wings and were considered distracting.

The front light was especially effective, according to pilots.

"That flash is like a machine gun and the immediate impulse is to get out of the way," said one pilot. "The slower flashing side and aft lights were effective in that they were attention-arresting and alerting and the natural reaction was to watch closely and take appropriate evasive action."

Other mountings suggested by Atkins were:

One light each at the nose and tail of the fuselage and on each side of the vertical fin.

One light each at the nose and tail and one on each side of the fuselage near the nose.

Side and forward flashing units on each wingtip and a rear flashing unit on the tail.

One lamp each at the nose, tail and wingtips.

The Atkins light has no moving parts—all switching and timing is done electronically. Printed circuits are used. The unit is entirely self-contained, requiring only the aircraft power supply.

Development of the light is being carried out by the Aircraft Danger Light Corp. of Minneapolis with an assist by the Mechanical Division of General Mills. No production models have yet been built but several airlines have been using or have ordered test models.

Specifications of Atkins anti-collision light

Voltage required: 115v, 400 cycle ac; 12-b-24-volt, 450-cycle dynamotor power source.

Power consumed: 60 watts.

Fuse required: 3-amp.

Effect of altitude: no difficulty to 30,000 ft.

Radio interference: power supply self-contained and shielded.

Size: 6x4½x32 in. (airliner model).

Approximate weight: 5 lbs.

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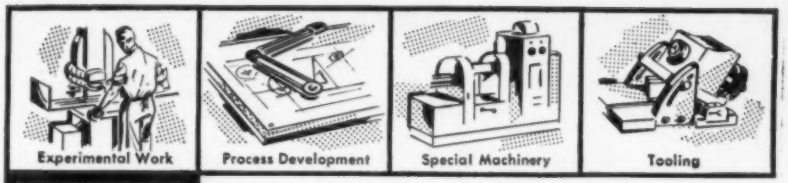

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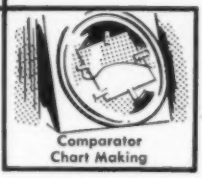

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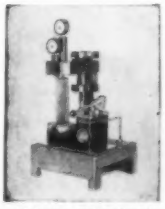
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Weapons Guidance is one of the laboratories that form the Wright Air Development Center. WADC, in turn, is the largest Center under the Air Research and Development Command. At its location at Wright-Patterson Air Force Base, Ohio, upward of 10,000 military and civilian workers are engaged in research, development and testing of aircraft, guided missiles and all types of associated flight and ground equipment.

This is one of a series of ads on the technical activities of the Department of Defense.

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Five-year plan for modernizing airways goes to Congress

Estimated outlay required for CAA's jet-age program is $2.4 billion; $810 million for equipment alone

An expanded and expedited five-year program developed by the Civil Aeronautics Administration for modernizing the nation's air traffic control system to meet jet age has been submitted to Congress.

Cost of equipment required under the program is estimated at $810,045,000. Maintenance and operations costs will account for another $1,616,668,000, making the total estimated outlay more than $2.4 billion.

Actually the program is for the six years 1957-1962. It is a revision of the plan announced a year ago for 1957-1961, which called for equipment expenditures of $246,000,000.

Commerce Secretary Sinclair Weeks said the increased cost is due to the addition of the sixth year and telescoping of a long-range program for jet transport operations which now are only two years off. Also, Weeks explained, funds for the Vortac system of air navigation aids are included.

CAA Administrator James T. Pyle said that "this first revision of the expanded Federal Airways Plan places continued emphasis on radar as the best available solution to the traffic control problem. Radar will enable us to provide greater safety through positive separation of aircraft by 'electronic' visual means."

The plan is designed to give CAA controllers the "eyes" to control traffic en route, and in terminal area, landing and ground operations.

Equipment included in the plan:

Air Route Surveillance Radars (ARSR)—23 of the 73 provided for have already been purchased by CAA.

These radars and associated long-range communications will be used to guide aircraft during en route operations.

Airport Surveillance radars (ASR)—47 of the 115 are operating or programmed with current funds. Used for control around terminal areas.

Precision Approach Radar (PAR)—23 of 43 provided for have already been programmed.

Airport Surface Detection Equipment (ASDE)—74 of these radars for use in controlling traffic on the ground at major terminals are provided for. No

Federal airway plan for establishment of air navigation facilities

Schedule for Fiscal Years 1957-1962

Facilities or Services	Total Quantities Thru FY 56	In Plan	Thru FY 62	FY 1957 Qty.	FY 1957 Cost	FY 1958 Qty.	FY 1958 Cost	FY 1959 Qty.	FY 1959 Cost	FY 1960 Qty.	FY 1960 Cost	FY 1961 Qty.	FY 1961 Cost	FY 1962 Qty.	FY 1962 Cost	FY 1957-1962 Total Cost (in thousands)
Long Range Radars	4	69	73	28	22,342,000	21	30,662,000	20	33,600,000	..	.....	..	.....	..	.....	$ 86,604
Terminal Area Radars	..	..	..	..	282,000	..	13,805,000	..	16,120,000	..	20,340,000	..	4,000,000	..	4,000,000	58,547
a. Airport Surveillance Radar (ASR)	45	70	115	2	.....	23	.....	25	.....	20	.....	..	.....	..	.....	.....
b. Precision Approach Radar (PAR)	23	20	43	..	.....	..	.....	..	.....	20	.....	..	.....	..	.....	....
c. Airport Surface Detection Equipment	..	74	74	..	.....	10	.....	16	.....	16	.....	16	.....	16	.....	.....
ATC Radar Beacons (Secondary Radar)	..	231	231	18	1,993,000	20	2,037,000	82	8,540,000	90	9,472,000	20	2,080,000	..	.....	24,122
Air Route Traffic Control Centers	31	3	34	3	300,000	..	.....	..	.....	..	.....	..	.....	..	.....	300
Air Traffic Control Towers and CS/T's	194	77	271	17	1,474,000	12	1,132,000	12	1,152,000	12	1,176,000	12	1,200,000	12	1,200,000	7,334
VORTAC System (formerly Omniranges/DME)	..	..	..	..	24,503,000	..	44,161,000	..	74,238,000	..	63,796,000	..	25,200,000	..	23,588,000	255,486
a. VHF Omniranges (VOR)	498	219	717	82	.....	137	.....	..	.....	..	.....	..	.....	..	.....	.....
b. Backfit VOR's with TACAN rho/theta	..	717	717	161	.....	65	.....	240	.....	240	.....	11	.....	..	.....	.....
c. VORTAC's (theta/rho/theta)	..	513	513	64	.....	7	.....	151	.....	105	.....	93	.....	93	.....	.....
d. VOR Test Signal Facilities (VOT)	3	106	109	3	.....	25	.....	33	.....	26	.....	..	.....	19	.....	.....
Instrument Landing System (ILSTAC)	..	..	..	..	3,590,000	..	10,505,000	..	15,858,000	..	18,719,000	..	5,097,000	..	4,757,000	58,526
a. ILS only	170	30	200	..	.....	30	.....	..	.....	..	.....	..	.....	..	.....	.....
b. Backfit ILS's with TACAN rho	..	200	200	55	.....	15	.....	55	.....	75	.....	..	.....	..	.....	.....
c. ILSTAC's	..	89	89	..	.....	..	.....	30	.....	30	.....	15	.....	14	.....	.....
Approach Lighting	..	..	..	..	2,051,000	..	7,746,000	..	7,635,000	..	3,194,000	..	4,255,000	..	3,775,000	28,656
a. Standard Approach Lighting	19	241	260	19	.....	64	.....	68	.....	26	.....	34	.....	30	.....	.....
b. Sequenced Flashing Lights	3	55	58	2	.....	32	.....	5	.....	6	.....	5	.....	5	.....	.....
Relocations, Improvements, Miscellaneous																
a. Long Range Radars					697,000		.....		6,375,000		12,475,000		9,600,000		8,000,000	37,147
b. Terminal Area Radars					565,000		5,117,000		1,005,000		1,625,000		5,868,000		2,070,000	16,250
c. ARTC Centers					27,703,000		3,066,000		15,000,000		24,500,000		22,840,000		10,000,000	103,109
d. ATC Towers and CS/T's					931,000		5,857,000		6,760,000		5,500,000		5,500,000		5,340,000	29,888
e. ATCS (formerly INSACS)					634,000		8,900,000		6,000,000		4,000,000		2,000,000		2,000,000	23,534
f. IATCS (formerly OFACS)					59,000		1,714,000		300,000		200,000		100,000		100,000	2,473
g. VORTAC's					3,022,000		2,908,000		1,000,000		1,500,000		2,700,000		1,400,000	12,530
h. ILSTAC's					597,000		639,000		1,550,000		1,500,000		1,000,000		950,000	6,236
i. Approach Lighting					200,000		150,000		200,000		500,000		500,000		500,000	2,050
j. L/MF Facilities and Fan Markers					134,000		836,000		500,000		1,000,000		800,000		500,000	3,770
k. Intermediate Fields					170,000		1,261,000		1,500,000		750,000		500,000		500,000	4,681
l. Flight Inspection Aircraft					8,490,000		5,442,000		2,000,000		3,500,000		2,000,000		1,500,000	22,932
m. Living Quarters					60,000		1,135,000		1,500,000		1,500,000		2,000,000		2,500,000	8,695
n. Utility Services					101,000		1,457,000		500,000		500,000		500,000		500,000	3,558
o. Unclassified					602,000		970,000		1,125,000		1,279,000		5,200,000		4,450,000	13,626
Totals					$100,500,000*		$149,500,000		$202,458,000		$177,026,000		$102,940,000		$ 77,630,000	$810,054

Source: CAA

* Contingent upon additional funds for FY 1957

Operations and Maintenance Costs

Facilities or Services	FY 1957		FY 1958		FY 1959		FY 1960		FY 1961		FY 1962	
	Positions	Amount	Positions	Amount	Positions	Amount	Positions	Amount	Positions	Amount	Positions	Amount
Long Range Radars	301	$ 2,477,568	1,628	$ 6,216,601	2,445	$19,006,000	4,360	$ 38,510,000	5,918	$ 59,254,000	6,155	$ 71,151,000
Terminal Area Radars	1,836	12,641,677	2,449	18,444,664	3,503	26,359,000	4,376	37,852,000	5,295	47,789,000	6,396	59,535,000
ATC Radar Beacons (Secondary Radar)	17	78,024	46	400,510	83	659,000	143	1,197,000	400	2,954,000	710	6,171,000
Air Route Traffic Control Centers	4,032	25,947,054	5,171	44,966,862	6,068	56,829,000	6,553	64,852,000	6,815	70,165,000	7,088	74,919,000
Air Traffic Control Towers and CS/T's	3,395	22,929,556	4,113	30,523,040	4,735	38,348,000	5,360	45,226,000	5,947	51,919,000	6,584	59,017,000
Air Traffic Communication Stations	4,677	30,887,768	4,921	35,858,815	4,934	38,232,000	5,152	41,281,000	5,331	44,278,000	5,500	47,209,000
International ATC Stations	1,031	7,207,766	1,100	8,366,152	1,155	10,405,000	1,213	11,233,000	1,258	12,057,000	1,305	12,874,000
VORTAC System (formerly VOR/DME)	834	7,544,192	1,399	13,544,047	2,444	24,636,000	2,780	37,559,000	3,779	51,499,000	4,757	72,287,000
Instrument Landing System (ILSTAC)	468	3,876,164	597	5,445,930	806	8,366,000	968	11,801,000	1,043	14,075,000	1,118	15,995,000
Approach Lighting	75	803,553	82	889,838	149	1,378,000	176	1,949,000	171	2,388,000	199	2,871,000
L/MF Facilities and Fan Markers	511	4,929,054	560	5,829,993	568	6,852,000	568	6,312,000	435	5,698,000	435	5,926,000
Intermediate Fields and Light Beacons	115	1,161,624	93	1,143,548	93	1,338,000	93	1,391,000	93	1,447,000	93	1,505,000
Totals	17,292	$120,484,000	22,159	$171,630,000	26,983	$232,408,000	31,742	$299,163,000	36,485	$363,523,000	40,340	$429,460,000

Source: CAA

equipment of this type is in use at present.

Vortac, the common civil-military short range navigation system—Plan includes 1,230 through 1962.

Instrument Landing Systems (ILS)—30 to be added to the 170 now in use. All 200 of these will be backfitted with distance-measuring feature of Vortac by 1962. Another 89 ILS will be installed beginning in 1959.

Air Traffic Control Radar Beacons, also called Secondary Radar—231 called for by Plan.

Airport Traffic Control Towers—Plan will add 77, bring total to 271.

Air Traffic Control Centers—Plan will add three, bring total to 34.

CONTRACTS

Air Materiel Command announces the following contracts:

General Electric Co., $11 million, J79-GE-5 turbojet engines.

United Aircraft Corp., $11 million, facilities.

Continental Motors Corp., $7,862,877, packette engines and engineering data.

Curtiss-Wright Corp., Propeller Div., two contracts, $2,019,432, material and services for product improvement, and $3,039,004, propeller components, spare parts and tools.

Stewart-Warner Corp., $3,624,127, radio transmitters.

Hughes Aircraft Co., $1,016,687, spare components and parts for fire control system.

Columbus Jack Corp., $1,655,708, hydraulic hand jacks.

Sundstrand Machine Tool Co., $5,466,385, transmission governor assemblies, spares, constant speed drives and support equipment.

Borg-Warner Corp., $3,269,750, signal generators.

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Here are first design details of Vertol 76

Tilt-wing VTOL, developed jointly by Army and Office of Naval Research, nears flight-test stage

by William Beller

ANOTHER TOOL may soon be given to Army strategists who are calling for highly maneuverable ground forces and for storage depots removed from battle areas. It's the Vertol 76, a tilt-wing VTOL paid for by the Army, developed in cooperation with the Office of Naval Research and designed and built by Vertol Aircraft Corp.

On April 15, 1956, Vertol received an $850,000 contract for the design, fabrication and test of a flying tilt-wing test-bed. Chief objective: check out principles of tilt-wing design. Less than a year after contract signing, shop work on the Vertol 76 was completed and the craft was undergoing functional tests. Flight tests are expected this summer.

Vertol 76 is an example of one of a group of hybrid aircraft designed for good VTOL and forward flight characteristics. The tilt-wing concept comprises a propeller-wing combination that is rotated to a near vertical attitude for hovering flight, and to the normal fixed-wing attitude for level flight.

In all VTOL craft, horsepower is converted to static thrust in the hovering regime. On this basis, the most efficient VTOL design is the helicopter. Least efficient design in terms of static thrust per horsepower is the jet tailpipe.

Vertol engineers say that the tilt-wing configuration is the most efficient if forward speed is important, particularly in the 300—400-knot range. Beyond these speeds, propeller-rotor efficiency falls off.

If primary mission of a craft is landing and takeoff from small areas, rescue work, pontoon bridge construction, flying crane use and other general utility purposes, then relatively low disc loadings are needed in order to keep downwash velocities small. Disc loading is the ratio of aircraft gross weight to rotor disc area.

For helicopters, downwash velocities usually range between 30 and 60 ft. per min. Excepting the helicopter, the tilt-wing configuration is said to have the lowest VTOL downwash velocities. For disc loadings between 25 and 100 lbs. per sq. ft., downwash velocities are 140 and 280 ft. per sec. respectively.

Fans control pitch, yaw

Vertol 76 is powered by a Lycoming T-53 gas-turbine engine, located aft of the cockpit and above the fuselage structure. Part of the turbine power is transmitted through shafting to two ducted fans, one in the vertical and the other in the horizontal stabilizer. These fans, through a pitch-changing mechanism, are used for pitch and yaw control of the craft during hovering and transition flight.

The fan controls also actuate appropriate control surfaces, which are effective during level flight.

Vertol 76 uses standard helicopter controls plus a wing-tilt control located on the pilot's control column.

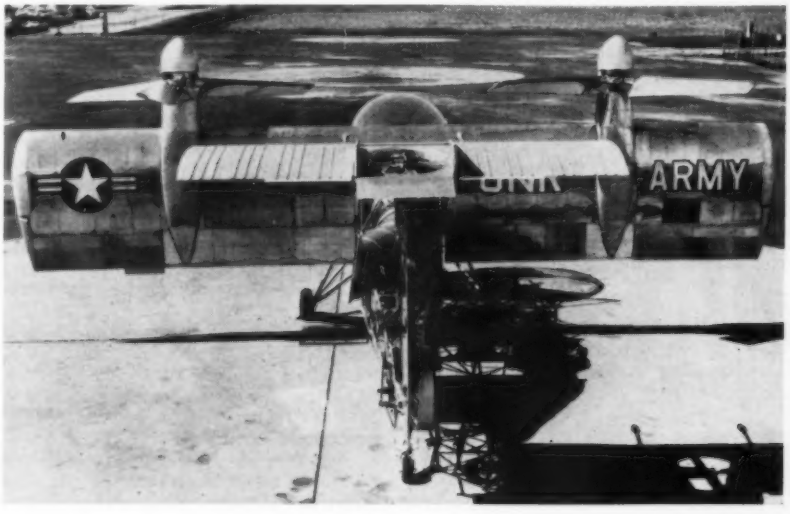
The rotor-propellers are free flapping and have no drag hinges. A differential collective pitch mechanism governs roll control when the wing is vertical. As the wing is tilted forward for level flight, the differential collective pitch is gradually and automatically washed out to zero. At the same time, the ailerons start becoming effective.

In the airplane configuration, the pilot uses his collective pitch control to vary the pitch of what are now fixed-wing propellers.

There is said to be negligible reactive torque imposed by the deflected exhaust of the turbine engine. This particular exhaust design was chosen to avoid sending the hot gases into the tail. Between 60 and 75 lbs. residual jet thrust to aid forward propulsion is expected.

Wing airfoil section is a NACA 4415, tail section a NACA 0012. The horizontal stabilizer is all-movable except for the part housing the horizontal fan.

VERTOL 76 tilt-wing flying test-bed is presently undergoing ground tests for Army.



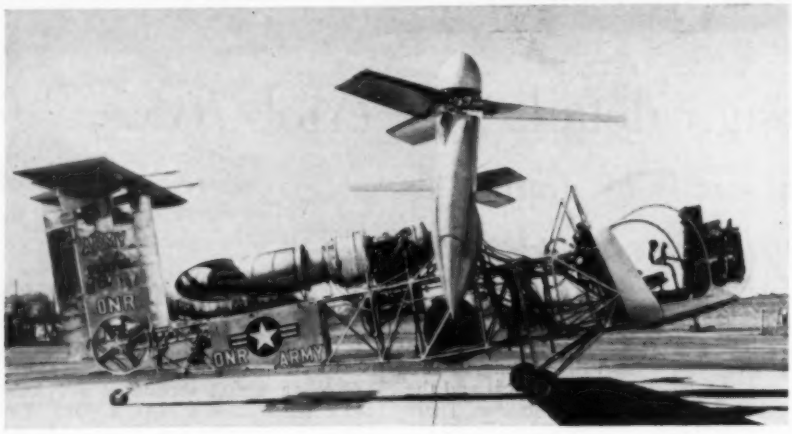
STOL capabilities are inherent in tilt-wing aircraft. If vertical rise is not required, the aircraft's gross weight can be increased. Vertol 76 performance is classified.

Standard practices and procedures and non-critical materials were used wherever possible in designing and building the craft. This was done to keep unknowns to a minimum and to complete the project within the short contract time. Advantage was taken of the studies and experimental work that the National Advisory Committee for Aeronautics had performed on tilt-wing aircraft.

Gleason Gear Works furnished the major spiral gears for the transmission assembly, which was designed and developed by Vertol. Parsons Corp. furnished the rotor propellers, Harrison Radiator the oil coolers and Cessna Aircraft Co. the tail gear.

The cockpit bubble was Army-supplied from the Bell H-13 helicopter. The wing-folding servo cylinder for

TILT-WING AIRCRAFT features two ducted fans, one in the vertical and one in the horizontal stabilizer, for pitch and yaw control during hovering transition flight.



wing tilting was a Vertol H-16 rotor-control actuator.

Principal Vertol engineers responsible for design and development of the craft are Lee Douglas, engineering vice-president; W. Stepniewski, research and development chief; David Richardson, chief research and development project engineer; and Paul Dancik, project engineer who coordinated design and fabrication.

Vertol has no contracts for tilt-wing development besides its present one. But Douglas estimates that, based on the success of the current test-bed program, scheduled for late 1958 completion, "prototype vehicles will be available between 1962-1965 for military and commercial use." Present military thinking indicates a VTOL competition in early 1959.

Douglas also strongly supported the Army's backing of test-bed programs, such as the Vertol 76, for developing novel aircraft. The Air Force, on the other hand, prefers going into full-fledged prototypes.

A rule of thumb figure for approximating prototype development cost is $1,500 per gross-weight pound. On this basis, if 3,000 pounds were taken as the gross weight of the Vertol 76, prototype cost would be $4.5-million. This price is in sharp contrast with the actual contract figure.

Building test beds does not mean using cheap engineering design. As Douglas put it: "In cheap engineering, if the prototype is good, we don't know why. If the prototype is bad, we still don't know why and we may abandon a worthwhile project plus a large sum of money."

He pointed out that the same quality engineering should be used for test-bed development as for prototype vehicles. However, the hardware should be small, inexpensive and designed flexible so that engineering modifications can be made quickly and easily.

The genesis of the Vertol 76 goes back to 1952 when Alexander Satin, then chief engineer of the Air Branch of ONR, and W. Z. Stepniewski met in Washington to discuss general VTOL concepts.

Two years later Vertol received an ONR contract financed by the Army to evaluate all possible VTOL systems useful for Army missions.

From this study, six VTOL systems emerged as promising for transport aircraft requiring cruising speeds of 300 mph or more, having a radius of action of several hundred miles and operating only a few minutes hovering.

In addition to the tilt-wing, these systems are:

(1) *Deflected slipstream.* Vertical lift is derived from the propeller slipstream, which is deflected through a large angle by means of special flaps. Ryan Aeronautical Co. is nearing completion of a test-bed version of this design.

(2) *Tilting ducted propellers.* VTOL characteristics are obtained by rotating shrouded propellers to a near vertical attitude. For level flight, the axes of the propellers are rotated to the horizontal position. Doak Aircraft Co. has a flying test-bed.

(3) *Hover-jet.* To a conventional jet-propelled transport aircraft are added supplementary jet engines whose efflux is directed down for hovering.

(4) *Vertodyne.* Forward flight thrust is derived from the horizontal discharge of hot gases in a conventional turbojet aircraft. For hovering flight, the hot gases are directed to a turbine that drives ducted fans submerged and rotating in a horizontal plane in fixed wings.

(5) *Vectodyne.* The vectodyne aircraft has no lifting surfaces. It depends entirely on sustaining and control forces generated through the proper deflection of a ducted jet stream.

Vertol chose the tilt-wing configuration because it felt it was the best compromise for achieving hovering flight together with forward flight capabilities in the modern speed range.

For the hovering flight regime, the advantage of rotor-propellers is seen in the following figures: helicopters yield 12-15 lbs. static thrust per horsepower. VTOL propellers, which are larger than conventional, yield 3½-5 lbs. static thrust per horsepower. Normal propellers yield 2-2½ lbs. and the hovering jet or tail sitter less than one pound.

When vertical flight is the primary consideration and speed secondary, then the helicopter is the best choice. As desired forward speeds increase, the tilt-wing design becomes significant. In the overall picture, when forward speed increases, the entire spectrum of VTOL craft must be analyzed, and that craft best suited for development in the needed flight regime studied.

Vertol 76—weights and dimensions

(approximate)

Gross weight	less than 3,500 lbs.
Useful load	800 lbs.
Two pilots plus gear	400 lbs.
Fuel	300 lbs.
Miscellaneous	100 lbs.
Engine	T-53 Lycoming
Weight	480 lbs.
Diameter	27 in.
Shaft horsepower	825
No. propeller-rotors	2
Diameter	9.5 ft.
Tip speed	700 fpm
Wing span	24 ft.
Aspect ratio	5
No. ducted fans	2
Diameter	2 ft.
Overall length	27 ft.

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Shifting tides becloud overall industry outlook

But bulging backlogs would indicate sustained high production and sales levels will continue through 1957

by Selig Altschul

THE AIRCRAFT INDUSTRY, as a group, enjoyed a banner year in 1956. All-inclusive compilations showed both sales and net profits at new highs. Moreover, order books were bulging and, on the surface at least, the industry is well on its way toward achieving sustained high production and sales in 1957.

This is the outward look. The overall industry appearance, however, tends to camouflage the intense milling about going on among the separate companies. The shifting tides are largely the result of budgetary economies and the major changes in government procurement policies with respect to aircraft and missiles.

The composite aircraft industry is estimated to have had net sales of about $9.5 billion for 1956. This compared with around $8.5 billion for 1955 and $8.3 billion in 1954.

According to the First National City Bank compilation of 38 aircraft and parts companies, net income after taxes came to $320 million in 1956, up 2% over the $315 million reported for 1955. (The Aircraft Industries Association shows that 12 major airframe companies had net sales of $5.6 billion in 1956 as against $5.2 billion in 1955. Net profits, however, for this group was reported at $156.5 million in 1956, down 12.5% from the reported $178.8 million of 1955.)

In recent years, delineations among the separate aircraft companies have also tended to become more pronounced. Nevertheless, outward manifestations of what may appear to be sharp cleavages between the "haves" and "have-nots" are not always clearly discernible. Backlog figures, for example, tend to obscure the nature of bookings, whether prime or sub-contracts and if military or commercial. Yet these are among the key elements which help to determine the position, outlook and ultimate results of the individual companies.

That important distinctions do, in fact, exist among the various aircraft companies is clearly evident in the exclusive AMERICAN AVIATION compilation of results for 19 individual aircraft units covering 1956 operations.

For the first time, three companies emerged into the magic circle of having sales in excess of $1 billion each—Douglas, General Dynamics and Boeing. Douglas, in 1956, surpassed its previous peak year sales of $1,061 million established in 1944. General Dynamics showed a whopping 52% increase in sales over 1955. Boeing fell short of its recent $1,027-million billings of 1954.

Crowding the $1-billion mark in sales last year were United Aircraft and North American Aviation. The rest of the list shows wide variations in annual sales from Lockheed's $743 million to Ryan's $47 million.

Profit margins also show distinctive markings for the separate companies. Curtiss-Wright, with heavy commercial deliveries, looks best in this respect, reporting a net profit margin of 7.6% on sales. Cessna with pronounced activity in civilian sales, leads the airframe builders with a net profit margin of 6.3% on sales. The rest of the group is in a surprisingly narrow profit margin band averaging around 3%. (The First National City Bank series shows a 1956 net profit margin of 3.4% on sales for 38 aircraft and parts companies.)

There is no consistency either in the group as to dividend policies. Divi-

Selected data for aircraft manufacturers—1956

Calendar or Fiscal Year

Year Ended 1956	Company	Latest Indicated Backlog	Sales	Profits Before Taxes	Pre-Tax Profit Margins	Net Income	Net Profit Margin	Per common share: Earnings	Per common share: Dividends	Per common share: % Dividend Payout	Net worth start of year	Earned on net worth after tax
			(000,000)			(000)					(000)	
9/30	Beech	$ 103.0[1]	$ 74.5	$ 7.5	10.1%	$ 3,331	4.5%	$4.45	$1.20	27.0	$ 12,835	26.0%
12/31	Bell	175.0	216.0	11.8	5.5	5,761	2.7	2.21	1.25	56.6	37,410	15.4
12/31	Boeing	3,024.0	1,006.4	67.1	6.7	32,135	3.2	4.82	1.22	25.3	123,975	25.9
9/30	Cessna	91.8[2]	66.3	9.0	13.6	4,206	6.3	5.75	1.20	20.9	12,289	34.2
12/31	Chance Vought	508.0	118.2	8.6	7.3	4,135	3.5	3.81	1.60	42.0	26,171	15.8
12/31	Curtiss-Wright	564.0	571.1	91.6	16.0	43,154	7.6	5.15[3]	2.34[3]	45.4	157,543	27.4
11/30	Douglas	2,209.0	1,073.5	71.7	6.7	33,202	3.1	8.96	4.00	44.6	137,347	24.2
12/31	Fairchild Engine	187.0	155.1	4.1	2.6	1,951	1.3	.64	.25	39.1	35,720	5.5
12/31	General Dynamics	2,195.0	1,047.8	61.6	5.9	31,947	3.0	4.14	1.73[4]	41.8	119,302	26.8
12/31	Grumman	322.0	197.5	16.1	8.2	7,703	3.9	3.50	2.00	57.1	47,223	16.3
12/31	Lockheed	1,597.5	742.6	30.4	4.1	15,073	2.0	5.10	2.40[5]	47.1	97,778	15.4
12/31	Martin	810.0	359.0	23.0	6.4	10,840	3.0	3.73	1.60[6]	42.9	56,680	19.1
6/30	McDonnell	679.8	186.2	14.1	7.6	6,752	3.6	4.55	.50[5]	11.0	21,767	31.0
9/30	North American	1,285.0	914.0	57.9	6.3	28,761	3.1	3.59	1.65	46.0	94,686	30.4
7/31	Northrop	228.0	322.5	10.5	3.3	4,965	1.5	3.28	1.60	48.8	25,409	19.5
12/31	Republic	226.0	346.2	15.0	4.3	7,367	2.1	5.00	2.00	40.0	42,966	17.1
10/31	Ryan	92.0	46.9	2.6	5.3	1,257	2.7	3.36	.50	14.9	10,105	12.4
12/31	Temco	180.0	90.3	4.8	5.3	2,257	2.5	1.35	.75	55.6	10,403	21.7
12/31	United Aircraft	2,300.0	952.9	75.2	7.9	37,082	3.9	7.05[7]	3.00	42.6	166,210	22.3

NOTES: [1] *As of October 31, 1956.*
[2] *Military backlog only.*
[3] *Includes Class A shares convertible share for share into common.*
[4] *Adjusted to give effect to 3 for 2 stock split during 1956.*
[5] *Excludes 3% stock dividend.*
[6] *Excludes 5% stock dividend.*
[7] *After Preference dividends.*

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dend payments range from 11% of earnings for McDonnell to 57% for Grumman.

The measure of earnings reported on net worth is assuming increasing significance. Disclaimers to the contrary by renegotiation Board officials, this measure is presumed to figure prominently in renegotiation examinations.

For 1956, earnings on net worth, after taxes, for the most part, have been consistently below that of 1955 results. In this respect, in the absence of the detailed considerations which enter into those reviews, it would appear that the industry, as a group, may be less vulnerable to renegotiation claims for 1956 than for the immediate preceding years. Of course, each company's position has to be evaluated separately before any conclusive determination can be made.

Despite the release of earnings, as reported during recent years, there is no finality to these figures until the complete cycle of price-redetermination and renegotiation processes have run their course. And this can take place anywhere from three or more years after the fact.

For example, 1953 represented a highly successful year for most aircraft companies and a sharp contrast to results of the preceding year. Almost in unison and virtually without any dissenting notes, each annual 1953 report confidently asserted that in management's view, the company in question did not earn any undue profits and hence was not believed subject to any renegotiation refund. Therefore, no provision was made for such eventuality in the accounts. Nevertheless, it is a simple fact of life that for any management to provide for such a renegotiation contingency would be an open invitation for the renegotiation Board to "come and get it."

With the 1956 annual reports now come disclosures by a number of aircraft companies that renegotiation claims have been made on 1953 operations. More prominent in the claims being pressed directly by the renegotiation Board or their regional offices and attributed to 1953 results are the following:

Company	Claims of excessive profits	Net after taxes
Boeing	$7,500,000	$2,057,793
Cessna (A)	N.A.	161,979
Douglas	6,000,000	1,320,000
Grumman	N.A.	1,340,000
Lockheed	N.A.	1,300,000
Martin	4,000,000	1,760,000
North American	6,000,000	1,300,000
Republic (B)	N.A.	987,587
Temco	3,750,000	1,048,000

NOTES: (A) For 1954
(B) For 1952

The delayed action of these renegotiation claims serve as another grim reminder that aircraft earnings have a long course to traverse before they can be counted as certain.

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And Cap'n Sharp is real proud of his airport diagrams, all 1,200 of them in the *new* Jeppesen Radio Air-Route Guide. Yes, the New Guide has 1,200 diagrams with runways; taxiways; ramps; lighting; buildings; obstructions; storage, repair and fuel availabilities; elevations; and cross index of cities and fields.

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Aerodynamicist

The Electronics Division of Curtiss-Wright Corporation has an excellent opening in New Jersey for an aerodynamicist to analyze flight performance characteristics of all types of aircraft, using theoretical design and flight test data. The results of these data are used as a basis for design of large scale analog systems as used in flight simulation. B.S. or M.S. in Ae. E. and 1-6 years' experience in performance analysis and stability and control with airframe manufacturer.

Excellent starting salary and unusual employee-benefit program. Send complete resume of education, experience and salary requirements. It will be treated confidentially. Write to:

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Curtiss-Wright Corporation, Wood-Ridge, N.J.

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Precision radiography: valuable inspection tool

by Henry P. Steier

AN OLD LABORATORY TOOL is being brought up to date to meet mounting needs for laboratory precision in electronics production work.

It is precision radiography. Except for a few isolated cases it has been used mainly for low-quantity inspection.

Some of the prospects for increased use of precision radiography were recently revealed in the work of the Raytheon Manufacturing Co., which is applying the technique to achieve reliability control and lower production costs.

The company now radiographs all of its special subminiature electron tubes for guided missiles, radars and other defense weapons.

For years the electronics field has been deprived of X-ray inspection on a full production basis. The predominant trend was to stick with quantity limited medical or metallurgical standards and techniques.

Increasing demand for reliability and subminiaturization of components has resulted in a more thorough search for some means of nondestructive examination of the components like the subminiature tubes made by Raytheon.

Expanding use of these tubes in missile control and aircraft systems is seen in their use in Nike missiles and in such equipment as Federal Telecommunication Laboratories' ARN-21 and ARN-26 receiver-transmitter and data link.

Flight and control of an aircraft or guided missile can fail through a single tube failure. For example, a single open weld in a tube structure can cause failure. A single tube might have 15 welds. Failure of one of these can be just as catastrophic as failure of a weld in an aircraft frame.

Despite highly developed controls and inspection techniques, weld strength and soundness determination have always involved a certain amount of intuitive guessing.

These welds are made on wire stock from 0.003 to 0.015 inch in diameter. Microphotos of a weld indicate only that a weld has been attempted. They give no evidence of weld strength.

A radiograph of a weld clearly indicates presence of a weld "nugget" and its soundness with regard to penetration, inclusion or other embrittlement factors.

Other causes of catastrophic failure could be close spacing of parts, loose metallic particles, defective heaters, distorted grids, etc.

Inspecting for such defects is virtually impossible without opening the tubes. Some of the parts are much finer than human hair, and most are concealed by surrounding elements.

Thus far quality control has been handled by visual inspection and the mathematical tools of statistical analysis. But even with this method defects slip by because of human limitations which are both physical and temperamental.

X-ray techniques commonly used in medical and metallurgical examinations have serious limitations for radiographing fine objects which in the case of subminiature tubes go below 0.003 inch in size.

What is seen in a radiograph is the shadow of an object through which the X-rays either did not penetrate and gives clear film areas, or which absorbed the rays to different extents and gives gray shadows on the film.

The fineness of a shadow is limited by the size and distance of the light source in optics. The same is true of X-rays which are the "light" source in radiography.

The shadow of an object illuminated by a finite source of light at a finite distance consists of two shadows. These are the areas receiving no light (called the umbra) and the area receiving some light (the penumbra).

Outline of the umbra is set by those rays from the "light" source which are tangent to the object. This is the only geometrically true shadow.

RAYTHEON MANUFACTURING CO.'s automatic X-ray subminiature tube inspection machine. First of its kind for mass quantity inspection, machine has aided improved reliability in missile and aircraft systems. Concave dishes improve radiography geometry that permits X-ray film to produce clear images of fine parts in the tubes.

The Flying Tiger Line Inc.

GENERAL OFFICES: LOCKHEED AIR TERMINAL BURBANK, CALIF. STANLEY 7-3411
UNITED STATES AIRFREIGHT ROUTE NO. 100 CABLE ADDRESS: FLYTIGER

Mr. B. C. Monesmith, Vice President
Lockheed Aircraft Corporation
Burbank, California

Dear Burt:

Here are photos of our first trans-Pacific operation with our new Lockheed 1049H Super Constellations. It was a complete success -- we couldn't have handled this MATS contract with any other transport.

Four days later, here in the States, we carried a record commercial air cargo load -- flying 41,746 pounds of general cargo from Newark to Burbank.

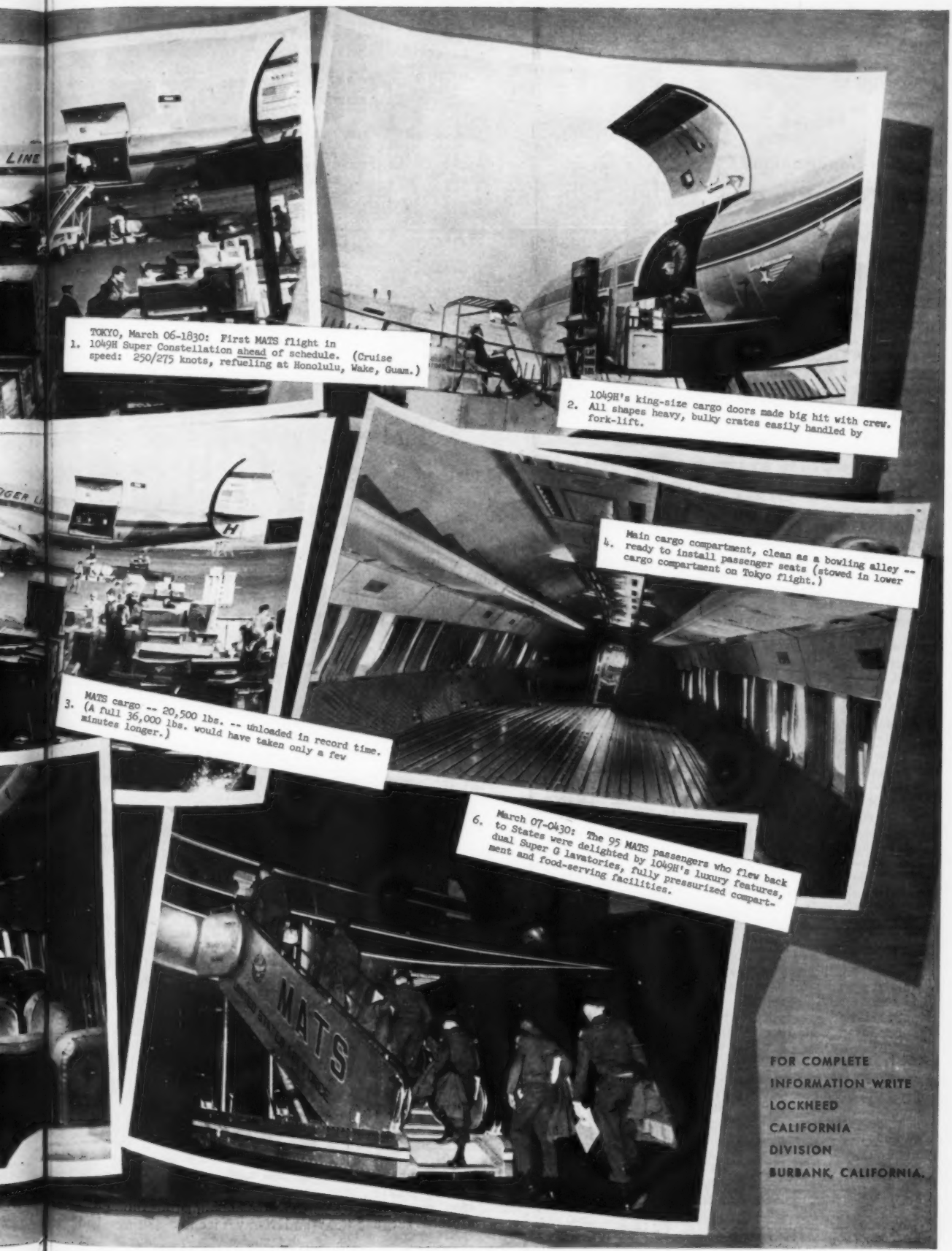
The convertible cargo-passenger Constellation is just what our industry has long needed. We're getting profitable new business we couldn't bid before. We're now converting our long haul Flying Tigers fleet to 1049H Super Constellations.

Best regards,

Frank B. Lynott

Frank B. Lynott
Vice President, Operations

5. Seats installed. Unloading and conversion took less than 10 hours -- while the flight crew logged a little sack time in Tokyo.



TOKYO, March 06-1830: First MATS flight in
1. 1049H Super Constellation ahead of schedule. (Cruise speed: 250/275 knots, refueling at Honolulu, Wake, Guam.)

1049H's king-size cargo doors made big hit with crew.
2. All shapes heavy, bulky crates easily handled by fork-lift.

MATS cargo -- 20,500 lbs. -- unloaded in record time.
3. (A full 36,000 lbs. would have taken only a few minutes longer.)

Main cargo compartment, clean as a bowling alley --
4. ready to install passenger seats (stowed in lower cargo compartment on Tokyo flight.)

March 07-0430: The 95 MATS passengers who flew back
6. to States were delighted by 1049H's luxury features, dual Super G lavatories, fully pressurized compartment and food-serving facilities.

FOR COMPLETE INFORMATION WRITE LOCKHEED CALIFORNIA DIVISION BURBANK, CALIFORNIA.

Career opportunities for:

Research, Development and Production Engineers

MANY NEW aeronautical controls—like the Vanguard Rocket Guidance Reference System shown on the facing page—are currently being developed by Honeywell Aero. These advanced programs offer exciting careers in Minneapolis in such areas as:

INERTIAL GUIDANCE SYSTEMS • DIGITAL COMPUTERS • FLIGHT CONTROL SYSTEMS • JET ENGINE POWER CONTROLS • ENGINE INLET DIFFUSER CONTROLS • AIR DATA COMPUTERS • BOMBING COMPUTERS • FUEL MANAGEMENT SYSTEMS • VERTICAL, RATE AND INTEGRATING GYROS • TRANSISTOR AMPLIFIERS • INSTRUMENTATION

Opportunity through growth! Engineering personnel at Honeywell Aero has tripled since 1951, and is still growing faster than the avionics industry average. Future growth looks even more promising, for rapid technological advances in the aircraft and missile fields are dictating more and more complex integrated flight control and weapons systems.

Developing and producing these systems is Honeywell Aero's business. Honeywell Aero pioneered the mass production of the most precise of all gyros—the floated gyro—and is still the only manufacturer in the U. S. producing a complete line. Honeywell has produced over 45,000 flight control systems, more than any other manufacturer and has long been the leading supplier of LABS, the automatic low altitude bombing system.

Join the leader in this expanding field of aeronautical controls. Make Honeywell's growth, *your* growth and fill your future with opportunities.

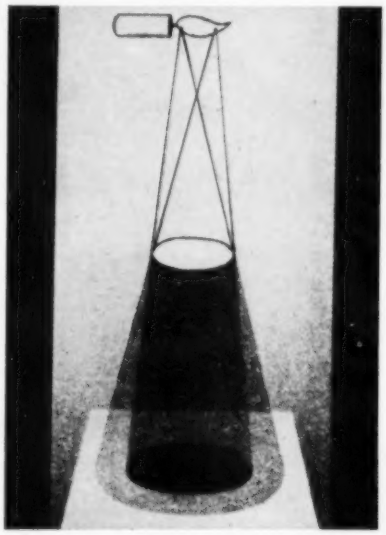
Act now!

For more information about your career opportunities at Honeywell Aero, call or write: Bruce D. Wood, Technical Director, Dept. TA25D, Honeywell Aero, Minneapolis 13, Minnesota.

MINNEAPOLIS **Honeywell**

AERONAUTICAL DIVISION

The other shadow comes from rays striking the object at an angle.



PENUMBRA EFFECT gives two shadows of an object. As the light source-to object distance becomes greater and the source smaller the effect is diminished. This handicaps precision radiography.

If a shadow with a clear line of demarcation is needed, as in the case of an X-ray inspection of a subminiature tube or other small object, the penumbra effect is very detrimental.

To reduce this effect the light-source-to-object distance can be increased or a point source of light used. In X-ray work extension of distance between the source and film becomes impossible at relatively short distances because of impractical X-ray energy requirements for large distances.

This is set by the Inverse Square Law: "Intensity of radiation at any surface varies inversely as the square of the distance of that surface from the radiating body."

Another factor is the absorption by air of large amounts of X-ray energy. This varies according to wavelength.

In normal radiography used in the laboratory the practice of radiographing one object at time placed against a flat film holder gives fair definition of fine objects.

But Raytheon wanted to check thousands of tubes each day by X-ray. Eric A. Kolm, process development engineer, decided that if the film plane were curved, and the radius of the film plane were equal to the X-ray source-to-film distance, all points within the X-ray "light" cone would be perpendicular to the impinging rays.

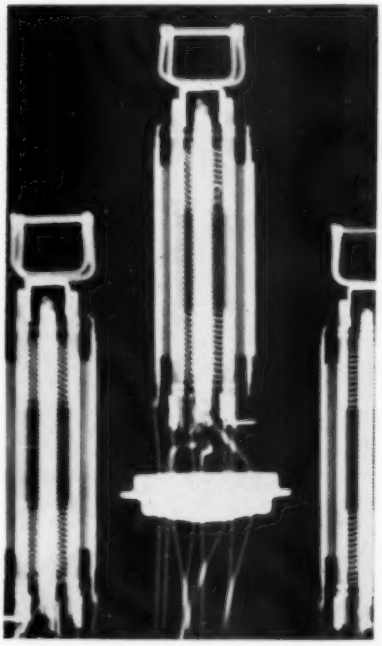
He developed a film holder or dish that is essentially part of a sphere with the "light" source at the center. The included X-ray beam cone angle is 40 degrees. At a distance of 36 inches it produces an X-ray area of 500 square inches which is useful for precision radiography of over 100 tubes at a time.

The X-ray source is a North American Philips Co., Inc. Norelco MG 150 tube with a focal spot of only 0.4 millimeter. Film used is Dupont Type 510 with fine grain and special emulsion.

To handle the production quantities an automatic machine was developed. It has a seven-foot rotating table divided into four quadrants.

Each quadrant carries a metal dish of spherical section. Tubes are placed in cardboard corrugated cardboard holders on the dish. The film is placed beneath the holders.

As the dishes rotate they are carried into a lead-covered booth containing the X-ray tube to protect operators from radiation. Exposure is made automatically and the table is indexed to the next position.



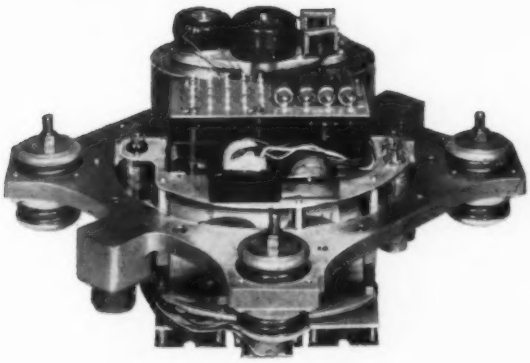
TYPICAL X-RAY PHOTO of tube mount. Pushed grid terms, shorts etc. are visible if present.

Another factor Kolm had to consider in his design was the different X-ray absorption characteristics of the many different materials used in making tubes, and the different wavelengths in an X-ray beam.

Scores of different materials such as lead, glass, nickel, barium, aluminum, iron, etc. exist in the alloys and chemicals in a tube.

In radiography of such materials in combination a difference between 110 kilovolts and 115 kilovolts can mean detection or non-detection on film of such things as small barium-coated particles which can short-out elements in a tube.

Therefore complete tables of data for all possible subminiature tube positions and X-ray machine settings had to be obtained. The machine setting



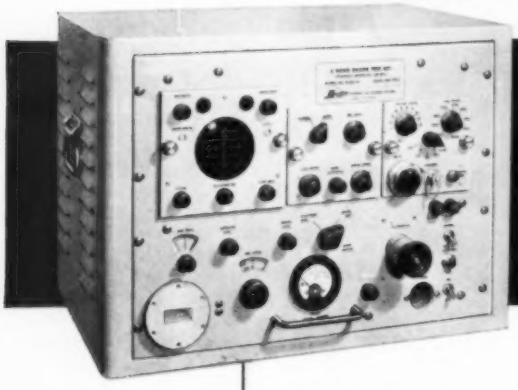
Here is the first photograph of the guidance reference system for Project Vanguard. Designed and built by Honeywell Aero, this sensitive electronic mechanism must keep the finless rockets on course despite intense vibrations and tortuous accelerations hitherto unknown. Because of these rigid demands, rugged, precise HIG-6 gyros were selected to sense pitch, roll and yaw in the system. The Vanguard Reference System is another example of Honeywell Aero's leadership in air-borne control systems.

AERONAUTICAL DIVISION, MINNEAPOLIS-HONEYWELL

Here is why Radar Producers and users prefer

Kearfott TEST SETS

...in the laboratory, in the field, in production



Test Sets for
X Band
C Band
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A complete testing unit in one compact portable case

All functions necessary for production testing, trouble-shooting and maintaining Radar Equipment available in one unit—controlled by a master switch. Saves bench space, testing time, can be moved to the job.

Makes all receiver and transmitter tests

Checks transmitter power, AFC lock-on, Frequency, Band width, spectrum shape, Receiver sensitivity, IF Band pass, TR recovery time, PPI Scope response and many other important tests.

Saves time, cost, and space

Kearfott Radar Test Sets occupy less space, are economical to buy, save valuable testing time compared with individual components such as power supplies, modulators, microwave plumbing and spectrum analyzers.

1957 Model incorporates new features

Write for Bulletin W-104 to obtain all the latest information on these Kearfott Test Sets.

Kearfott COMPANY, INC.
LITTLE FALLS, NEW JERSEY
WESTERN DIVISION
14844 Oxnard St., Van Nuys, Calif.
A SUBSIDIARY OF GPC

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data includes such things as voltage, current, exposure time and distances.

Machine settings are varied on the basis of the defects being sought, tube types and glass used as the tube envelope.

Each piece of film is coded with respect to tube type, source of production—department, team, shift, etc.—and whether the tube has experimental or production status.

A consideration of great economic importance together with increased reliability is feed-back of inspection information to the manufacturing departments.

Total elapsed time from receipt of the tube until results are known is about one hour. Raytheon is inspecting up to 18,000 tubes per day in this way.

Kolm was the recipient this year of the first DuPont Nondestructive Testing Award instituted by E. I. du-Pont de Nemours and Co., Inc. It was given in cooperation with the Society for Nondestructive Testing. The organization specializes in use of X-rays and other radiation sources for improved production and quality control.

Kolm says an obvious improvement in time might be obtained by using fluroscopy instead of radiography. This would eliminate the time lost in film development between exposure and analysis.

So far all attempts with fluoroscopy have failed because of poor definition in the pictures. Also electronic image intensifiers used with closed circuit TV have been tried but do not give the required definition.

In this last case the technique is limited both by the number of scanning lines and the first image intensifier conversion of the X-rays into the visible spectrum.

Improvements in the fluoroscopic technique are being attempted through modification of the initial X-ray image pick-up. A lead oxide coated cathode ray tube converter is being tried in this system.

Visual tracking device developed by Aerojet

Aerojet-General Corp. has developed a device for visual tracking of high-speed targets, missiles, drones or aircraft traveling above 60,000 ft.

Labeled AeromarKer, the device emits an eye-catching flash of light and dense smoke puff that is radar reflective and, under certain conditions, attractive to infrared seekers.

Three types of systems are available: a fixed type unit that may be mounted singly or in multiples on missile of aircraft structure surfaces; a multiple cartridge drum cannister system for mounting across diameter of the vehicle, and a multiple cartridge tube launcher system for installation in wing pods, faired sections or for attachment to bomb or camera pylons.

Each system is electrically actuated from the carrying craft or control point in another aircraft or ground position.

Curtis group predicts: 90,000 planes by 1976

The atmosphere of conjecture surrounding the status and future potential of U.S. general aviation was cleared last week when the General Aviation Facilities Planning Group released its report prepared for Edward Curtis, President Eisenhower's special assistant for aviation facilities planning.

The report represents the first well documented information covering the non-military and non-airline flying activities of the country. While it reveals nothing abnormal in the position of general aviation today or its prospects in 20 years, the report does give dimension to general aviation's size and importance.

For instance—the 10,080,000 flying hours last year exceed by three times the hours flown by airlines and the fleet of 57,579 active general aircraft is 40 times the size of the airline fleet.

In a decade the number of aircraft will be between 70,000 and 80,000 and the total number of flying hours will be in the neighborhood of 16 million. In 1976, the report predicts, 90,000 aircraft will be flying 20 million hours in general aviation operations annually.

Estimates place the peak number of general aircraft operations in and out of airports during the busiest day in 1976 at 588,000. Operations for activity in the Chicago hub area (28 airports) were cited as an example of the flight patterns expected in 20 years in any large metropolitan area.

Chicago airports will have some 18,900 takeoffs and landings on the peak day of the most active week in 1976. Of this number, most will be for local flights while cross-country flights will account for 2,200 operations. During the peak hour, some 460 aircraft will be in the air.

Following the upward trend in general aviation activity, peak demand in IFR conditions will also increase substantially. Even if the incidence of IFR operation for each aircraft remains the same as in 1956, this will account for an increase in IFR activity of from three to four times.

In addition, new developments and new installations supporting IFR flight operations will tend to increase the use of IFR operations across the total fleet. Overall IFR activity will be five to eight times the present load.

"The flight control system developed then must be adequate to handle the traffic in the largest hubs. The same system, but in much simpler form and utilizing the same airborne equipment, must be adaptable to handling the traffic at the small hubs," the report said.

Other highlights of report

Other high points of the report:

Most of the general aviation flying is for business purposes. During 1956 almost 80% was for business and in 1976 it is expected that 11 million of the 20 million miles will be for business.

Almost all types of aircraft are used in some manner in general aviation. These include mostly single-engine aircraft, with increasing numbers of small twin-engine and aircraft similar or identical to those used by airlines.

More than half the general aviation airplanes are owned primarily for business purposes.

While general aviation fleet is widely dispersed throughout the country, there is a marked tendency for airplanes to be owned and based in more populated areas. More than 60% of airplanes are in less than 10% of the countries.

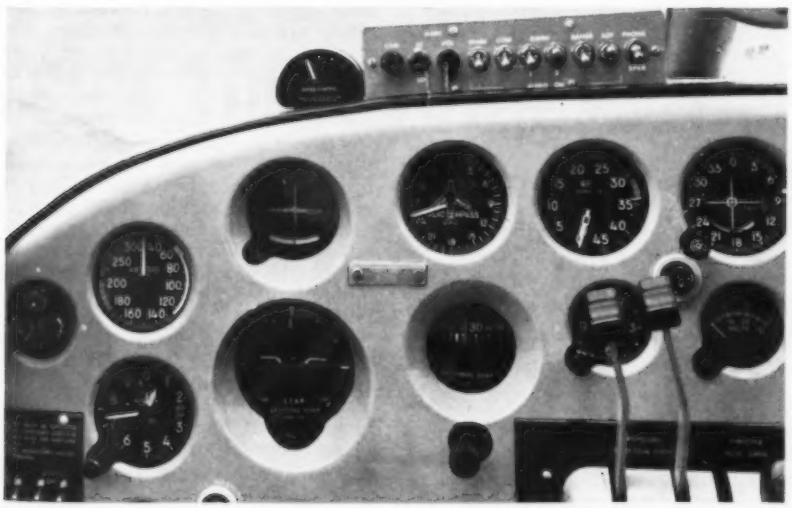
There is considerable cross-country flying from hubs but most is local. Proportion of cross-country flying is greater on week days. Large multi-engine airplanes are used mostly for cross-country. This fleet alone is larger than the total scheduled airline fleet of multi-engine craft. Most small one- and two-place craft are used for local flying.

General aviation's fleet of larger aircraft is fully equipped for Civil Aeronautics Administration IFR conditions and has extensive auxiliary radio and navigational equipment. More than 80% of smaller twin-engine fleet and more than half single-engine fleet of three or more places are similarly equipped.

General aviation flying, which takes place in the smaller hubs and in other than hub localities, will continue to be substantial. An adequate over-all facilities program must provide for these planes and this flying even though the traffic control problem will not be critical.

Barring unforseen scientific breakthroughs, progress in the fields of powerplants, economy, performance efficiency and weight reduction will be gradual as in the past decade. Some turboprops will appear among the larger types but there will still be a significant number of piston airplanes in 1976.

Speed control indicator redesigned



REDESIGN of speed control indicator of Safe Flight Instrument Corp. speed control system permits better location in cockpit. Now "half round" instrument can be mounted directly on cowl above panel or in glare shield of larger aircraft. This places information of lift conditions of wing in pilot's line of sight, permitting full concentration on runway during approach.

Number of General Aviation Aircraft by Classes

January 1, 1956

Aircraft Class	Certified Airworthy	Registered Aircraft	Inactive Aircraft
I (relatively large multi-engine)	1,630	1,909	279
II (light twin-engine)	1,525	2,204	679
III (single-engine three-place and over, mostly under 240 hp.)	22,545	27,326	4,781
IV (single-engine, one and two place)	31,623	48,513	16,890
V (helicopters)	256	306	50
Total	57,579	80,258	22,679

Source: Civil Aeronautics Administration.

ESTIMATED GENERAL AVIATION AIRCRAFT IN 1966-1976

Aircraft Class	1966 Range	1976 Range
I	2,100- 2,500	3,000- 4,000
II	4,400- 6,500	8,000- 10,000
III	35,000-40,000	45,000- 56,000
IV	28,500-31,000	24,000- 30,000
Total	70,000-80,000	80,000-100,000

Source: General Aviation Facilities Planning Group Survey.

New executive turboprop, priced at $1.2 million, will have 3,000-mile range, cruise at 425 mph

by Fred S. Hunter

A new turboprop executive aircraft, with a cruising speed of 425 mph and a range of 3,000 miles, is in the making at the On Mark Engineering Co. in Van Nuys, Calif.

It is scheduled to fly in mid-1958. Deliveries are promised to begin in the spring of 1959. On Mark is scheduling production of two custom-designed airplanes per month.

With its emphasis on high performance and a tentative price tag of $1,180,000, the On Mark 450 is pointed strictly toward the deluxe market in the business aircraft field. It is designed for transatlantic crossing to Ireland, transpacific to Hawaii or coast-to-coast nonstop in the U.S.

The first airplane already has been sold to Maytag Aircraft Corp. of Colorado Springs. It will be used, Board chairman L. B. Maytag, Jr., said, chiefly by its top staff members.

The On Mark 450 will be powered by two Allison 501-D13 turboprop engines of 3,750 shaft horsepower in combination with Aeroproducts Model 606 propellers. The engine-propeller combination will be similar to that of the Lockheed Electra and when the 4,000-hp dash-15 engines become available they will be incorporated. Fuel capacity is 2,100 U.S. gallons in wing and tip tanks.

A substantial portion of the On Mark 450 derives from the twin-engine Douglas B-26. Wings, flaps, elevators, horizontals and main gear from the B-26 are incorporated in the design of the new turboprop transport. This is an interchangeability feature enabling On Mark to accomplish major economies in engineering and production costs.

Preliminary specs & estimated performance data for On Mark Model 450 twin turboprop

Type of aircraft— Twin-engine turboprop, pressurized, medium transport tricycle gear, designed to comply with CAR 4b transport category.

Powerplants— Two Allison 501-13/15. 3750 to 4,000 eshp.

Propellers— Aeroproducts propellers, full feathering and reversible.

Fuel Capacity— 2,100 U.S. gallons.

Number of Places— Up to 14. Interior designed to customer specification.

Takeoff gross weight—	40,000 lbs.
Landing weight	33,000 lbs.
Empty weight	23,000 lbs.

Cruise speed— 80% cruise power

	Cruise speed, mph TAS	
Weight, lbs.	20,000 ft.	30,000 ft.
29,000	416.5	436
34,000	413.5	429.5
38,000	411	422

Rate of climb— Maximum continuous power.

	Feet per minute	
Weight, lbs.	5,000 ft.	20,000 ft
29,000	4,580	2,620
34,000	3,750	2,090
38,000	3,220	1,735

Rate of climb— One engine out, propeller feathered

	Feet per minute
Weight, lbs.	5,000 ft.
29,000	1,530
34,000	1,125
38,000	880

Ceiling— Maximum continuous power

Weight, lbs.	Ceiling, feet
29,000	43,500
34,000	38,200
38,000	34,700

Takeoff distance—

Weight, lbs.	Ground roll, ft.	Total distance to 50 ft.
40,000	2,070	4,170
36,000	1,655	3,260
32,000	1,290	2,500

Landing distance over 50 ft. obstacle, sea level, weight 33,000 lbs., anti-skid brakes, reversing propellers	2,200 feet
Maximum range	3,100 miles (statute)
Recommended cruise altitude	30,000 ft.

Pressurization—Dual cabin pressurization systems with engine drive turbines. Cabin pressurized to 5,000 feet MSL at 30,000 feet altitude; at sea level when cruising at 20,000 ft.

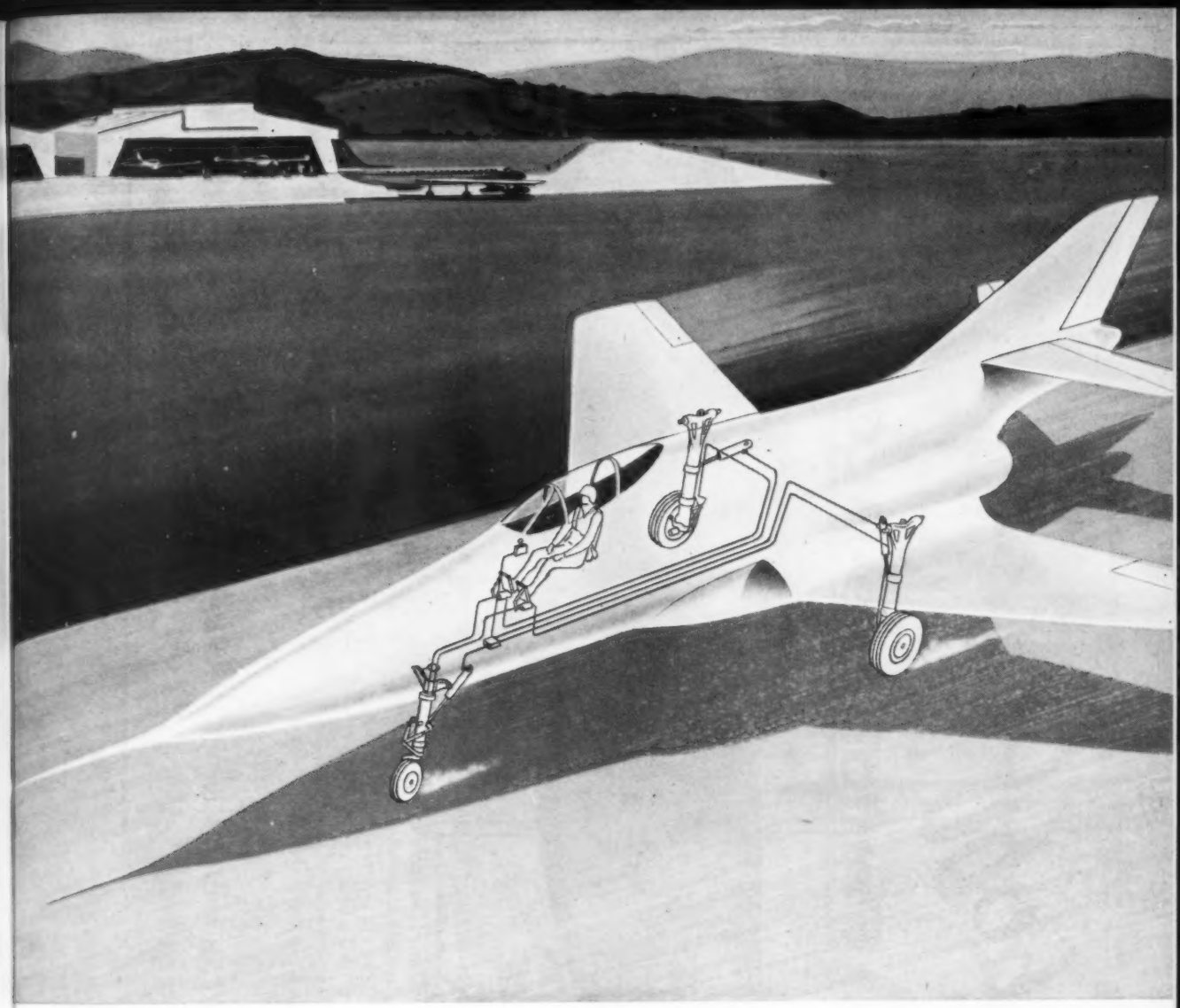
Bought 19 B-26s

The company was the successful bidder on 19 B-26s disposed of as surplus by the government in Manila and these are being shipped by boat to Van Nuys, where a number of them will be used in making up kits of basic parts for the turboprop airplane. On Mark bought the B-26s at an average price of about $13,000 each.

The On Mark 450 will have a pressurization system to provide a cabin pressure of 5,000 feet MSL at 30,000 feet altitude. It will be equipped with radar, automatic pilot and other navigational aids. Interiors will be customized to the exact tastes and demands of buyers to accommodate from 10 to 14 passengers.

Designer of the On Mark 450 is Floyd Snow, chief engineer of On Mark, who formerly was with Lockheed. Later he formed his own company, Aircraft Engineering Service Co., which continues in operation.

Snow is also the designer of the latest configuration for the interior of On Mark remanufactured B-26 executive planes. In these the aft wing spar is eliminated to enlarge the cabin and permit the entrance door to be installed



FROM TOUCHDOWN TO TAKE-OFF

WITH AN INTEGRATED BENDIX LANDING GEAR SYSTEM

When landing, taking off or just taxiing, safety depends upon the unfailing teamwork of everything that makes up the landing gear system.

Retractor actuation, control valves, nose wheel steering, power braking, as well as wheels, brakes and shock-absorbing struts—even tires—these are the things that make up the complete landing gear system. And it is vital that all components function together with split-second accuracy and efficiency.

That is why Bendix* specializes in complete and integrated landing gear systems. For, components that have been designed and engineered to work together give better and more dependable performance than any arbitrarily assembled system. The components of a Bendix landing gear system are engineered as a matched set, then tested and tuned to work together like a trained crew.

So, when it comes to gear for landing, think and plan in terms of a complete landing gear system. Then we suggest you think of Bendix and Bendix Products Division at South Bend, Ind.

*TRADEMARK

Bendix PRODUCTS DIVISION **South Bend,** IND.

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Bendix
AVIATION CORPORATION

Stroukoff C-134

The first Pantobase-BLC transport

SPECIFICATIONS

WING SPAN – 110 FT.

FUSELAGE LENGTH – 82 FT.

CARGO AREA – 4200 CU. FT.

Powered by two R 3350 – 89A Wright Turbo-compound engines

The usefulness of military transport aircraft has been extensively increased with the introduction of the Stroukoff C-134. Produced for the United States Air Force this rugged heavyweight requires extremely short take-off and landing runs and can operate from any prepared or unimproved surface–snow, ice, sand, water, etc. Advanced airframe design has been combined with Stroukoff Pantobase and Boundary Layer Control Systems to produce a new type of aircraft equipped for a variety of assault and logistic missions requiring operation without the limitation of conventional runways.

The Stroukoff C-134 is destined for an important role in modern military strategy.

Interesting opportunities for qualified engineers in many fields exist at Stroukoff. If your skills are not being used to full capacity, write us today. Your inquiry is confidential, of course.

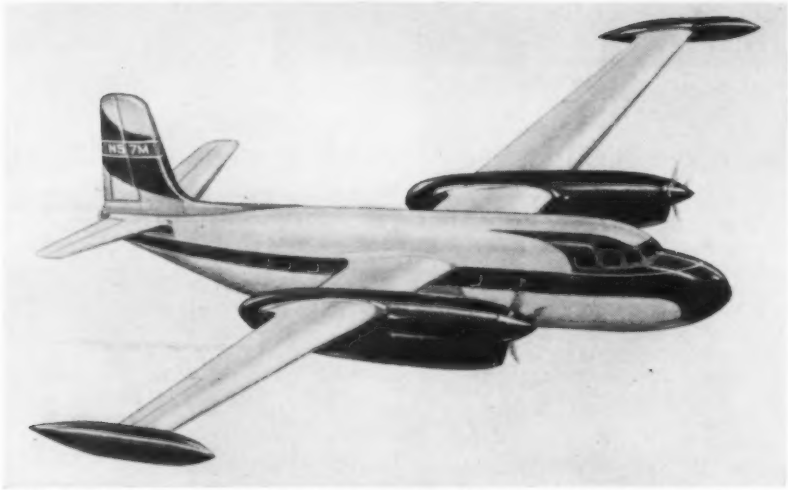
STROUKOFF AVITRUC

Extending the Frontiers of Aircraft Performance

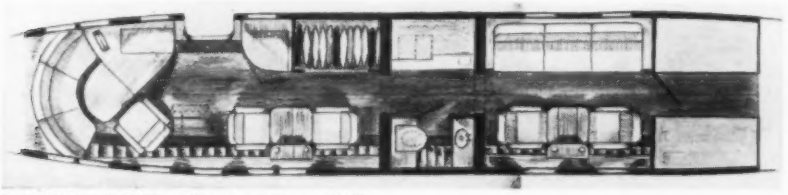
Stroukoff

AIRCRAFT CORPORATION

WEST TRENTON, NEW JERSEY



ON MARK 450, twin-engined turboprop with cruising speed of 425 mph and range of 3,000 miles, is aimed at deluxe business aircraft market.



CABIN LAYOUT of one version of On Mark 450 provides seats for 10 to 14 persons, desks and tables for working.

on the right side of the cabin instead of through the cabin floor.

On Mark recently moved from Burbank into a new 28,000-sq. ft. hangar at Van Nuys Airport, where it is continuing the remanufacture, modification, repair and overhaul of Douglas B-26s. For the new propjet executive, it plans to erect a new 60,000-sq. ft. hangar on adjoining land, President Robert O. Denny said.

The On Mark company was organized in 1954 by Denny, formerly president of Grand Central Aircraft Co., L.A. (Mike) Keithley, formerly operations manager of Grand Central, and William H. Doheny. The latter two are vice presidents of On Mark.

The company is the exclusive licensee of Douglas Co. in production of spare parts for B-26-type airplanes.

Correction

As a result of an error, captions for the charts illustrating the story titled "World Airline Revenues to Top $4 Billion This Year" (AMERICAN AVIATION, April 22, pp. 38 and 42) were reversed. The caption for the chart on page 38, referring to data shown in billions of passenger miles, actually referred to the chart on page 42, while that on page 42, referring to cumulative percentage distribution of revenue passenger miles, appeared under the chart on page 38.

narco

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Sapphire 1016

90 or 360
CHANNEL TRANSMITTER

90 or 560
CHANNEL RECEIVER

CRYSTAL CONTROLLED

MEETS CAA TSO
FOR AIRLINE USE

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NATIONAL AERONAUTICAL CORP.
Fort Washington, Pa.

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Electronics Plant, whose employees want to LIVE in SUNNY FLORIDA. Alert, alive, Ocala, in Central Florida, wants light industry—electronics preferred. Good supply of skilled and unskilled labor, favorable taxes, excellent transportation. Plenty of room for expansion, ideal living conditions year-round. Convenient to University of Florida research facilities, new Glenn L. Martin Plant, Cape Canaveral Project. Confidential assistance on surveys.

COMMITTEE OF 100
Box 838, Room 15
OCALA, FLORIDA

NEW PRODUCTS

Motorized hardness testers reduce operator fatigue; wide variety of new items reaching market

Two Kentrall motorized combination hardness testers have been introduced by the TORSION BALANCE CO.

The new models reduce operator fatigue by motorizing the major load with the result that production can be increased as much as 20%.

The testers are also effective for laboratory work where only a few tests per hour are made.

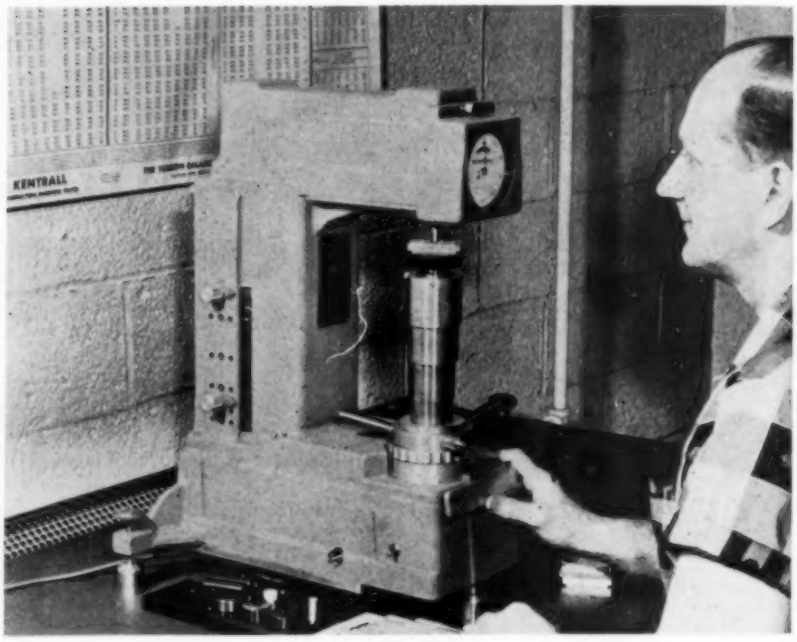
An advantage of the Kentrall testers is greater standardization of test results because the human element has been eliminated from application and removal of the major load.

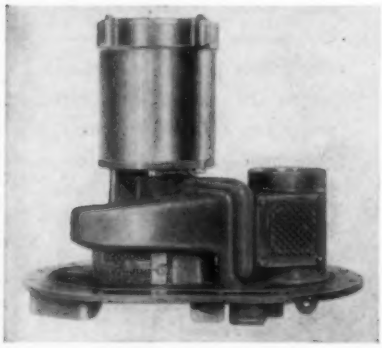
This part of the test cycle is particularly critical because here the operator's technique has its greatest influence on test results.

Load flexibility is another feature of the combination testers. Either of the two standard 8″ and 12″ vertical capacity machines can make tests on all Rockwell regular and superficial scales.

Motorized Kentralls are also available by special order in 4″ and 16″ vertical capacity sizes.

Circle No. 128 on Reader Service Card.



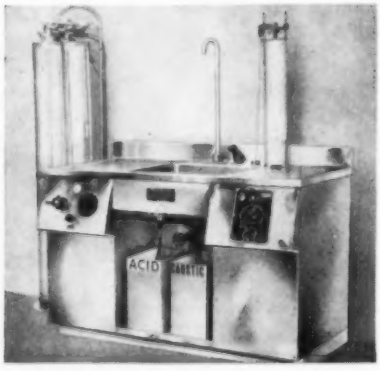


Water injection pump

Lear-Romec Div., LEAR, INC. offers a high-capacity water injection pump, Model RR11610, designed for gas turbine engines.

Pump is rated at 180 gpm at 35 psi gauge minimum discharge pressure. Motor requirements are 7 hp, 200 volts ac, 400-cycle, 3-phase, with a current drain of 20 amps. nominal at rated flow and pressure.

Circle No. 122 on Reader Service Card.



Demineralization system

Point-of-Use Demineralization system built by PENFIELD MFG. CO., INC., is solving the problem of a supply of ultra-pure water for cleaning transistors, tube parts and other critical components.

The system purifies water at rates up to 40 gal./hr. All wetted parts are plastic. The system includes a demineralization unit and a regeneration unit.

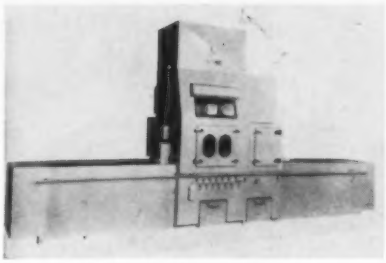
Circle No. 114 on Reader Service Card.

Temperature control

ASSEMBLY PRODUCTS, INC. has series 2300 thermocouple temperature control with very high sensitivity meter-relay, load relay and other components in compact package.

Temperature —400 to 3,000°F; thermocouples all standard types, 4 ohms/Mv; accuracy 2%, 40 to 90° ambient, 5% —40 to 150° ambient; compensation bimetal and thermistor; load switch SPDT 5A, 125v ac, non-inductive; case 1¾ x 4¼ x 4¾″ steel.

Circle No. 109 on Reader Service Card.



Automatic wet blast unit

Conveyerized automatic wet blast unit with rinsing facilities is offered by CRO-PLATE CO.

Unit features reversible, non-fixtured variable speed conveyer, blast cabinet with bell-crank oscillated gun cluster and cold water recirculating rinse cabinet. May be used for deburring airframe parts, long extrusions, machined forgings.

Circle No. 119 on Reader Service Card.

Derivative voltmeter

Derivative voltmeter made by MILJAN, INC., measures ultra-low rates of voltage change, drift and precession rates.

Accuracy is claimed within 2% of range. Typical change from 14.000 to 13.997 volts, .02% of total initial voltage, will be sensed by device. Measures 14⅛x8½x8″, operates on 115v, 60-cycle current.

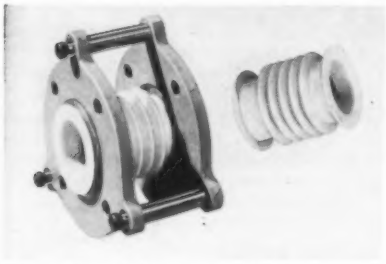
Circle No. 111 on Reader Service Card.

Proximity control unit

Extra-sensitive proximity transducer control unit permitting use of conventional electrical plugs at the output is available through ELECTRO PRODUCTS LABORATORIES, INC.

Model 4951-RAC has 3-pin AN type input connectors, SPDT mercury contact allowing 3,600 operations per minute, convenience receptacle wired for 115v ac through internal relay.

Circle No. 106 on Reader Service Card.

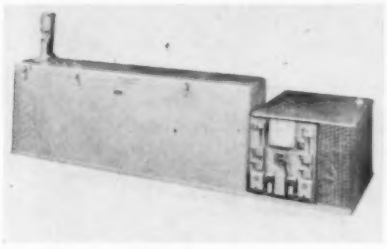


Expansion joints, couplings

CHICAGO GASKET CO. has developed a full line of Teflon expansion joints and couplings with replaceable bellows for glass, stainless steel and glass-lined pipe.

Bellows can be removed on job for cleaning, inspection or replacement. "Teflex" bellows will not impart taste, odor, color or other contaminations.

Circle No. 103 on Reader Service Card.

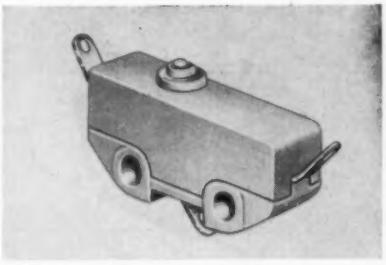


Chilling machine

Low-temperature chilling machine has been developed by CINCINNATI SUB-ZERO PRODUCTS.

Model 3SR-120-47 has 47 cu. ft. chamber, net thermal capacity of 6,000 BTU/hr at 120°F. Will chill 250 lbs. of steel per hour from 80° to —120°F. Chamber is 120x18x36″. Handles missile steel housing sheets up to 10x3 ft.

Circle No. 108 on Reader Service Card.

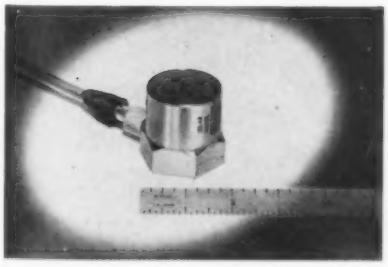


Plastic body switches

Plastic body switches, small enough so that nine could fit in a cubic inch, have been developed by HAYDON SWITCH, INC.

The #5300 series measures 25/32 x 17/32 x 1/4″. Two can be mounted, activator to activator, and operated in a 1″ diameter tube. Characteristics are 5 amp resistive at 28v dc; 5 amp resistive at 115v ac.

Circle No. 104 on Reader Service Card.

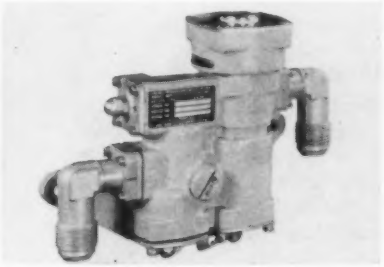


Accelerometer

Accurate vibration measurements at temperatures as high as 500°F are possible with Model 2242 accelerometer, Model 2615 cathode follower and Type 3090 connecting cable made by ENDEVCO CORP.

System is useful in engine-testing and high-speed flight-testing without cooling or correction. Total weight is 5 oz.

Circle No. 113 on Reader Service Card.

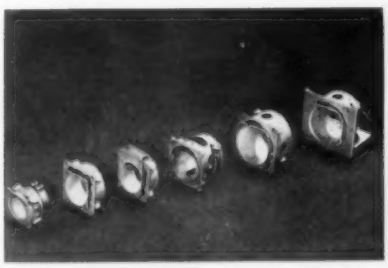


Anti-G valve

Single-weight Anti-G valve, Model 13100 made by ARO EQUIPMENT CORP. eliminates any need for manual setting, overcomes possibility of pilot error.

Valve meets specifications MIL-V-9370A and Military Standard Drawing MS24350, is available in four types according to porting requirements.

Circle No. 123 on Reader Service Card.



Mounting systems

ROBINSON AVIATION, INC., has extended its K130 design to cover 45 different models. All models are a radial cushion center-of-gravity mounting system incorporating Met-L-Flex elements.

All-metal construction gives durable and dependable service. Dimensions and load ratings vary from 1.8″ to 8.5″ diameter and 5 to 50 lbs.

Circle No. 112 on Reader Service Card.

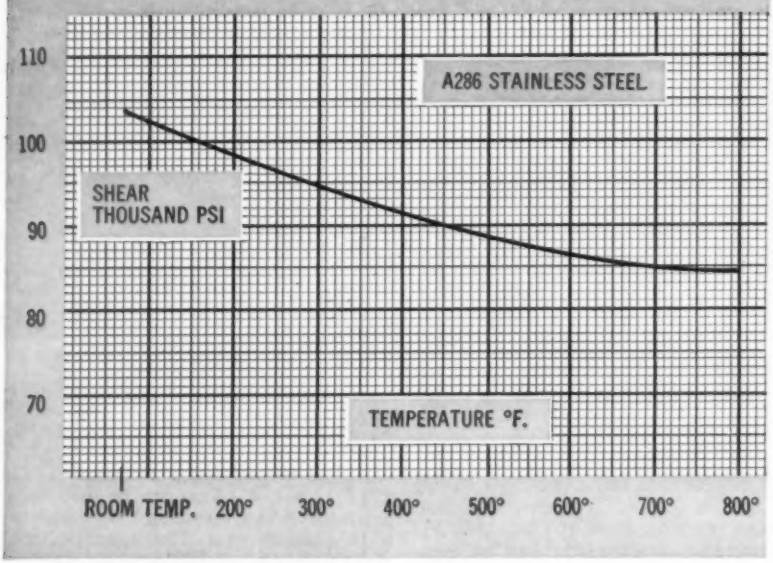
NOW, Cherry Rivet

announces the

✓HI-STRENGTH

✓HI-TEMPERATURE

"600" Rivet *



*Patents issued and pending

Another new product by CHERRY RIVET research and development to meet the design requirements imposed by extremely Hi-Speed Aircraft and Missiles.

Wide Grip Range • Positive Hole Fill
High Clinch • Uniformly High Pin Retention
Positive Inspection

For additional data on the *new* Cherry "600" Hi-Strength, Hi-Temperature Rivet, write to Townsend Company, Cherry Rivet Division, P.O. Box 2157-Y, Santa Ana, California.

CHERRY RIVET DIVISION

SANTA ANA, CALIFORNIA

Townsend Company

ESTABLISHED 1816 • NEW BRIGHTON, PA.

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

Circle No. 20 on Reader Service Card.

Cathode-ray oscilloscope

A portable three-inch cathode-ray oscilloscope, designed for field use or rack mounting, has been developed by ALLEN B. DU MONT LABORATORIES, INC.

The unit weighs 27 lbs., measures 5x19x11⅛ in., offers a sensitivity of 22 dc millivolts/in.; identical direct coupled X and Y amplifier and amplitude calibration on both channels; calibrated sweeps. Designated Du Mont Type 402.

Circle No. 115 on Reader Service Card.

Silicone rubber

DOW CORNING CORP. has introduced what it terms the toughest, strongest heat-stable silicone rubber yet developed.

Silastic 916 combines thermal stability and high dielectric properties of silicone rubber with mechanical strength and abrasion resistance closely approaching that of organic rubber. Nontoxic, serviceable at extreme low temperature, can be molded, extruded or calendered.

Circle No. 110 on Reader Service Card.

Aluminum manifold

An aluminum, 3-valve manifold, with 5 ports, has been developed by ROBBINS AVIATION for use in air distribution boxes operating from hi-vacuum to 3,500 psi with finger-tip control for all pressures.

Any or all of the valves may be completely overhauled without disturbing the plumbing. The valves are standard Robbins valves which use plastic seats and "o" rings.

Circle No. 105 on Reader Service Card.

Dip-soldering machine

ELECTRONICS PRODUCTS CORP. has developed a dip-soldering machine for the semi-automatic soldering of printed and etched circuit boards and assemblies used in electrical and electronic equipment.

Machine has capacity of 120 units/hr. and requires only one operator. Angle and depth of immersion are adjustable. Dwell time and solder temperature automatically maintained.

Circle No. 116 on Reader Service Card.

Servomanometers

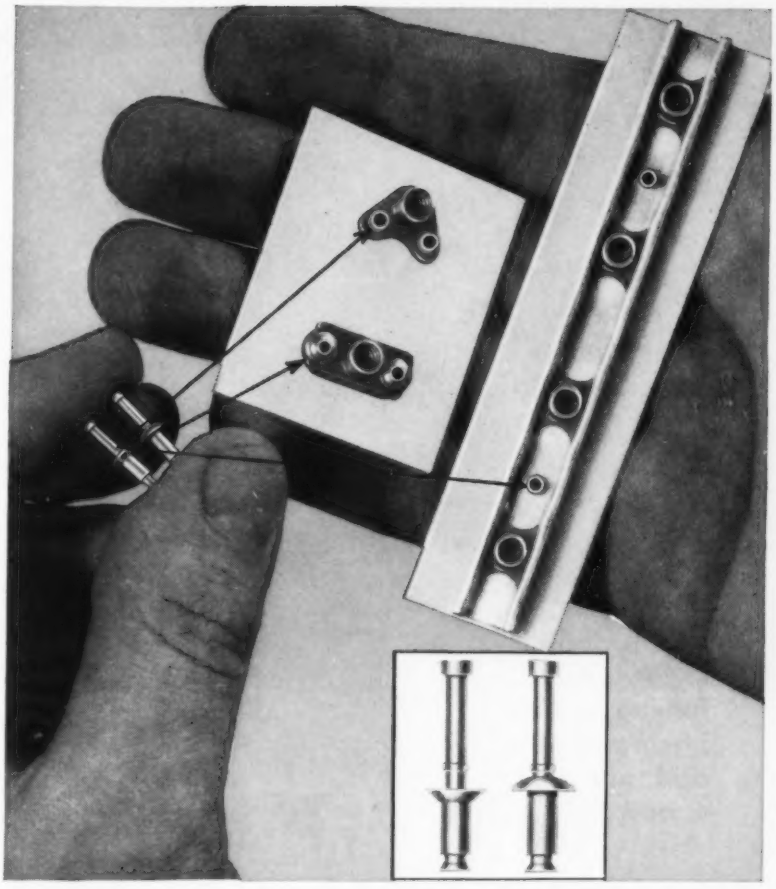
EXACTEL INSTRUMENT CO. has introduced 38 production model servomanometers in five standard ranges, 32 to 120". Readout is in inches, centimeters, millibars or microns; construction for barometer, absolute or differential pressure.

Circle No. 102 on Reader Service Card.

Omni converter

Four-in-one presentation for VOR/ILS localizer navigation is given by Narco VOA-3, produced by National Aeronautical Corp. Course is selected by turning knob until needle is centered. Selected course is indicated at bottom of azimuth; reciprocal course is automatically shown at top. To-From indication is shown in window behind Left-Right needle with red sector showing if signal is too weak for accurate navigation. Used with Narco Sapphire 1016 560-channel VHF transmitter-receiver or Narco VC-27 Simplexer unit.

Circle No. 124 on Reader Service Card.



For those "impossible" installations

Cherry Research Offers The 3/32" MONEL Hollow Pull-Thru Rivet

Available with either universal or 100° countersunk head, the Cherry 3/32" Monel Hollow Pull-Thru Rivet has a high shear strength particularly adapted to fastening nut plates, gang channel and honeycomb materials where extremely limited space makes use of solid rivets difficult. Damage to surrounding material in these difficult spots is eliminated with the pull-thru hollow rivet. Simplicity and speed of installation cut costs and save weight.

The new 3/32" Monel Hollow Pull-Thru Cherry Rivet can be installed with all existing Cherry Rivet guns, including the G-25 Hand Gun.

For technical information write to Townsend Company, Cherry Rivet Division, P. O. Box 2157-Y, Santa Ana, Calif.

CHERRY RIVET DIVISION

SANTA ANA, CALIFORNIA

Townsend Company

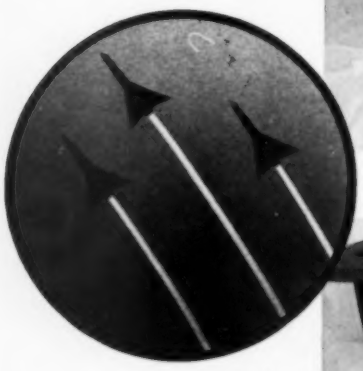
ESTABLISHED 1816 • NEW BRIGHTON, PA.

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

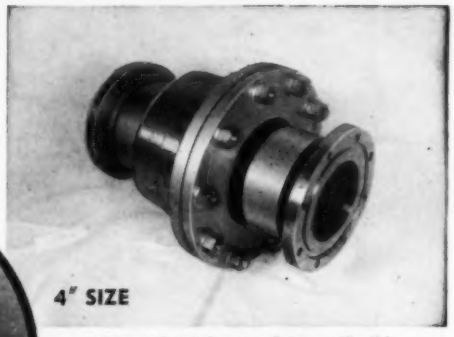
Circle No. 21 on Reader Service Card.

BARCO FLEXIBLE JOINTS

For Handling High Energy Fuels....



. . . . . liquid oxygen, white fuming and red fuming nitric acid, and JP 3, 4, and 5 fuel



4" special stainless steel Barco Flexible Ball Joint for handling liquid oxygen.

180° flanged 6" Barco Ball Joint for use in loading and unloading line handling liquid propellant.

-special designs for LOX and other Missile Fuels

Extensive design and manufacturing experience is yours to call upon at Barco for the handling of special liquid fuels in the aircraft, rocket, and missile industries:

—Flexible Ball Joints for metal loading lines handling corrosive fluids.

—Special flexible joints with leakproof seals for conveying fluids at low temperatures down to −300°F. Also high temperature designs up to +1000°F.

—Special designs resistant to nuclear energy radiation.

Barco joints provide flexibility *unlimited* for piping and tubing. Our engineers will be glad to work with you on special problems and assist with recommendations.

Flexible Hydraulic Lines for Missiles, Aircraft

MISSILE LAUNCHER HYDRAULIC ASSEMBLY

Barco produces high pressure self-aligning swivel joint and tubing assemblies for hydraulic pressures to 4,000 psi, and higher. Also a wide selection of standard and special swivel joints and assemblies for launching and flight gear. Sizes ¼" to 1".

ASK FOR NEW CATALOG 269-A.

BARCO *Serving Industry Since 1908* — AIRCRAFT DIVISION
MANUFACTURING CO., 5201 Hough St., Barrington, Ill.

Circle No. 22 on Reader Service Card

'Talking beacon'

AIR ASSOCIATES, A division of Electronic Communications, Inc., has developed a "talking beacon" which will guide small aircraft to safe landings. The beacon broadcasts beam direction from revolving antenna at 20° intervals.

Pilot flying between beams can judge proximity to each by relative strength of signal. Range is more than 50 miles. Unit weighs less than 2 tons, can be set up quickly, moved in truck.

Circle No. 129 on Reader Service Card

Fractional horsepower motors

New line of lightweight fractional horsepower DC motors has been introduced by LUNDY MANUFACTURING CO. The 26-volt motors range from 1/20 to 1/8 hp and weigh 15 to 22.5 oz.

Other features: electro-mechanical brake with high holding torque, integral radio noise filter, new brush rig construction, adjustable brake gap, steel inserts in aluminum housing for long life.

Circle No. 130 on Reader Service Card.

Differential dc amplifier

VIDEO INSTRUMENTS CO., INC., has introduced Model 71 differential dc amplifier, which utilizes transistors throughout and features extreme stability and low noise.

Maximum drift, after warm-up, is 3 mv. Response is from dc to 50 kc, input impedance is .5 megohm. Unit measures 3½x6x12 in., weighs 10 lbs. May be operated from 105-125v ac or mercury batteries.

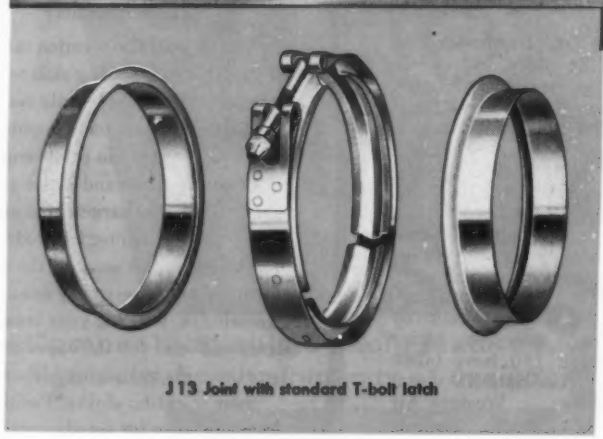
Circle No. 120 on Reader Service Card.

Instrument ball bearings

MINIATURE PRECISION BEARINGS, INC., is expanding its range of instrument ball bearings by adding a new size No. 814 thin instrument section ball bearing (bore .2500"; O.D. .5000"; width .1250 or .1875). New bearings are available in 440-C stainless steel and SAE 52100 high carbon chrome steel.

Circle No. 118 on Reader Service Card.

(More New Products on Reader Service Card)



J13 Joint with standard T-bolt latch

ON THE NEW LOCKHEED ELECTRA

MARMAN J13 JOINT Simplifies Connection of Hot Air Bleed Lines

Lockheed's new prop-jet airliner, the Electra, is designed for simplified, efficient inspection and maintenance. Use of Marman Lightweight J13 Joints, with safety strap, on the Electra's anti-icing system combines quick connection and disconnection of bleed air lines with positive sealing at 700°F. and 125 psi.

The J13 Joint consists of a lightweight V-band coupling with flange ends for standard and thin wall tubing, fabricated entirely of stainless steel. Formed flanges eliminate need for gaskets. Marman J13 Joint is available in O.D. tube sizes from 1″ to 6″. Larger diameters are available on special order.

Marman manufactures a complete line of joints, couplings, clamps and straps to simplify all kinds of aircraft fastening and joining problems. Write today for full information.

MARMAN DIVISION
Aeroquip Corporation

11214 EXPOSITION BLVD., LOS ANGELES, CALIFORNIA

IN CANADA: AEROQUIP (CANADA) LTD., TORONTO 10, ONTARIO

MARMAN PRODUCTS ARE MANUFACTURED UNDER VARIOUS U. S., CANADIAN AND FOREIGN PATENTS AND OTHER PATENTS PENDING

Circle No. 14 on Reader Service Card.

WEST COAST TALK

by Fred S. Hunter

Douglas putting $50 million into DC-8; turboprop version of DC-7C in works

DOUGLAS AIRCRAFT'S expenditures on the DC-8 will peak this summer, after which the monthly cash outlay will ease off. By the end of this year, Douglas will have $50 million—give or take a buck or two—invested in the jet airliner. But this won't be any great strain on the Santa Manufacturer's financial resources in view of the profits that will keep rolling in all year on its 15-a-month DC-6/7 production.

Douglas, incidentally, has come up with still another idea to keep its production line at Santa Monica going into 1960, or thereabouts, without missing a beat. This would be a passenger turboprop version of the DC-7C, using Allison 501 engines. Instead of long-range, like the piston-powered DC-7C, this proposed propjet job would be aimed at the short and medium-haul trade and a couple of feet would be clipped from the wing tips. It would cruise at 400 mph and be directly competitive with the Lockheed Electra. Douglas is trying to interest United. Other prospects: Northwest, Pan American.

New basic price of $3,720,000 for the Convair 880—up $20,000—reflects a $5,000 boost in the price of the General Electric CJ805 engine. Only escalator in Convair contracts on the 880 is that required by GE to cover the engines. Revised specifications on the 880, incidentally, will include the CJ805-3 engine in lieu of the CJ805-1. The dash 3 will develop about 10% more thrust.

Southern California Aircraft Corp., which operates an overhaul and repair base at Ontario International Airport, is branching out into the flight test contract field. Its first venture was a flight test program on electronic equipment for Gilfillan Bros., in which it furnished the aircraft, crew and installed the equipment. It is now negotiating with several other companies for similar programs.

Solar Aircraft is another west coast company building up its over-all management groups to meet the new industry conditions. "Technologically speaking, the pace of change is frightening," explains vice president Alexander Black. But through expansion of its research and development effort and diversification, Solar is in the best competitive position it has ever attained, he says.

It's too early to be specific where Northrop Aircraft may establish overseas offices, says vice president J. Gilbert Nettleton, Jr., named to head up the newly established international division . . . The Flying Tiger Line may introduce pre-palletized loading, starting this summer, to speed up ground handling of air freight . . . Clayton Scott, senior production test pilot at Boeing, was personal pilot for the late W. E. Boeing for eight years, before joining the company's flight test staff in 1941.

Mrs. Georgia M. Borthwick, in San Diego, tells the story, which illustrates the courage aviation pioneers possessed. She was T. Claude Ryan's secretary when the telegram arrived from Lindbergh 30 years ago asking: "Can you build a plane with a Wright Whirlwind motor capable of flight from New York to Paris?" "It seemed so ridiculous," she said, "that everyone laughed. Everyone except Mr. Ryan. He said: 'We'll quote him a price.'"

Convair's F-106 is larger than the F-102 and also has a smoother, racier look . . . More than 150 have taken Strategic Industries Association's visual quality control course . . . Western Air Lines has become famous for its "Champagne Flights," but it still served 193,000 glasses of milk last year.

With the Air Force's Phase II flight tests of North American Aviation's F-107 completed, the airplanes have been turned back to the company for Phase III tests and all three are now at Palmdale. Unofficial reports from Edwards indicate the F-107 gave an excellent account of itself in the Phase II testing, but the Air Force's budget problem seems to have it stymied, although North American still hasn't given up hope.

Lockheed's competition for the reclining seats for the propjet Electra hasn't been decided yet, but Hardman Tool & Engineering has won the order for the lounge seats. It also looks as though Hardman may have captured the Boeing 707 plum. It made the seats for the 707 mockup in New York, and now it's scheduled to deliver a mockup set of five-abreast reclining chairs to Boeing in Seattle this summer.

Marquardt Aircraft has scheduled dedication ceremony for its new Ogden ramjet plant for June 4.

To the ENGINEER of high ability

Through the efforts of engineers The Garrett Corporation has become a leader in many outstanding aircraft component and system fields.

Among them are:

air-conditioning
pressurization
heat transfer
pneumatic valves and controls
electronic computers and controls
turbomachinery

The Garrett Corporation is also applying this engineering skill to the vitally important missile system fields, and has made important advances in prime engine development and in design of turbochargers and other industrial products.

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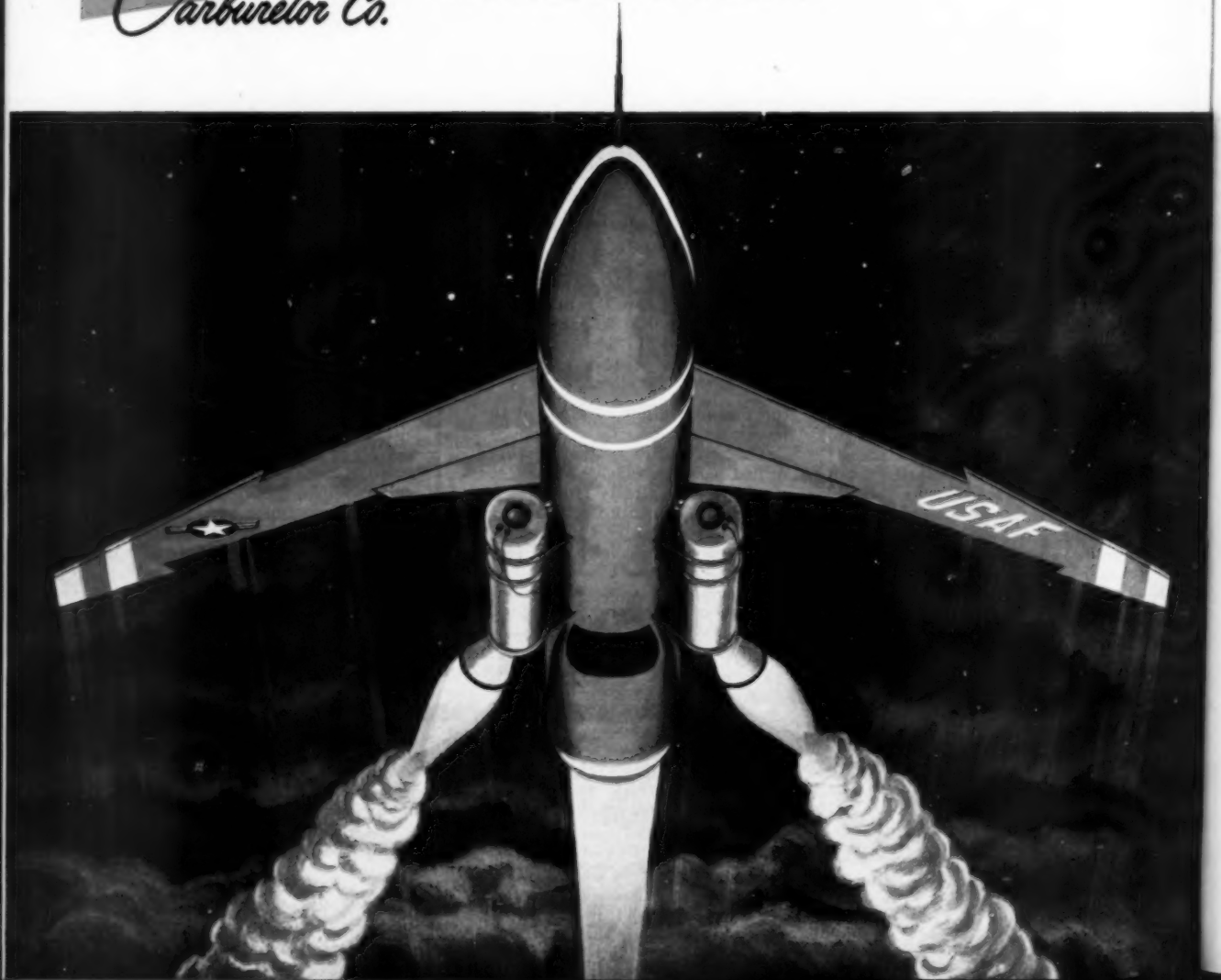

by Anthony Vandyk

What foreign airlines can expect

WHAT SORT of a reception awaits the next group of foreign nations that are lining up for bilateral air talks with the U.S.? The Dutch left Washington last month with two valuable new routes—Amsterdam-Houston and New York-Dutch West Indies. They did not attain their main objective, a route from Amsterdam to Los Angeles, but say they will be back for it later.

The heated controversy over the Dutch talks involving differing viewpoints on the part of Congress, State Department, CAB and the Air Transport Association, which went right up to the White House, has left foreign governments and carriers in a state of extreme confusion. It seems to them as though the State Department is their only friend. State's attitude (described by some as conciliatory, by others as realistic), has drawn criticism because of the adverse effect of route awards to foreign carriers on U.S. airlines.

State defends its attitude by saying that if foreign airlines are not given concessions their governments in the end will retaliate against U.S. carriers. And since U.S. carriers earn twice as much abroad as foreign airlines earn in the U.S., U.S. carriers stand to lose more than the foreign airlines in the long run.

According to State, among carriers of the 60 nations with which the U.S. exchanges air routes, only three earn more in the U.S. market than U.S. carriers earn in theirs. In all others the ratio favors the U.S. The Dutch situation is an exception—KLM earns $15 million a year in the U.S. while U.S. carriers earn only $1 million in a year from routes to Dutch territories.

The situation with the British is very different. U.S. airlines earn $50 million a year out of Britain, while the British carriers earn only $15 million in the U.S. market.

The Air Transport Association believes that it is right for U.S. carriers to earn more than foreign airlines, since seven out of ten international air passengers are Americans or foreigners residing in the U.S. ATA wants to restrict foreign carriers to the main gateways—say New York on the east coast and San Francisco on the west coast. It objects to foreign service being permitted to such places as Chicago, Boston, Houston, and Philadelphia.

Upcoming bilateral negotiations are not likely to resolve the basic difference in philosophy between State Department and ATA. On May 15 Australia starts talks in Washington in order to win an extension of Qantas Empire Airways' Sydney-San Francisco transpacific route across the U.S. to New York and then onward to London.

In June, the fight with the British is to be continued in London. At the Bermuda meeting two months ago demands for new routes by the British were a major factor in causing the negotiations to be recessed.

In July the Belgians and Swiss are due to appear in Washington with requests for west coast routes for their airlines.

Will these foreign nations get what they want? Chances are that, notwithstanding the sentiments of Congress and ATA, most of them will at least get something. The Australians have a solid bargaining wedge now that they have decided to align their defense program with that of the U.S.

The Belgians have a good case in that SABENA serves only one point in the U.S. (New York) while PAA serves not only Brussels but also Leopoldville in the uranium-producing Belgian Congo. The Swiss likewise can point out that TWA flies to both Geneva and Zurich while Swissair serves only New York.

The British also seem likely to get some concessions, because until they do, they are almost certain to block TWA traffic rights out of London to points east of Frankfurt and refuse Northwest Airlines rights at Hongkong.

BRIEFS

BOAC and **Cubana** have started a twice-weekly pooled service between Nassau and Havana operated with the Cuban carrier's Viscounts . . . **Eagle Aviation,** British independent, has ordered three Viscount 800s . . . **Lufttransport-Union,** German independent, has bought two more Vikings, one Bristol 170 Freighter and one DH Dove.

MAP REVEALING extent of Aeroflot's system is contained in spring issue of Russian carrier's schedules. Most of its services are operated with Ilyushin I1-12s, I1-14s or Lisunov Li-2s.

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Local airlines lack even 'outmoded' ATC facilities

Delays on and off ground are mounting because of the absence of control towers and approach services at key airports

by Joseph S. Murphy

DESPITE A STEAMROLLER EFFORT by Civil Aeronautics Administration to smooth out wrinkles in the nation's air traffic control system, the want of a few of today's "outmoded" facilities is quietly throttling development of the local service airline industry.

There are two opposing forces at work. While Civil Aeronautics Board is paying out subsidy to promote local service development ($23 million in 1956), an inherent lack of such fundamental items as CAA control towers and approach control services is impeding progress.

The problem? Many cities served by the locals suffer from what might best be described as criteria-itis—the inability to match a CAA standard number of traffic movements to qualify for facilities.

Virtually overlooked is the fact that the *absence* of the facilities is the one big item preventing these municipalities from producing the budget-book numbers referred to by CAA as criteria.

And as the ATC problem mounts at major terminals with increasing trunk airline traffic, the bulk of CAA's budget necessarily is directed to ease that situation. But as a result, criteria levels for basic ATC facilities are raised, just out of reach of key cities served by local airlines.

It not only brings severe losses in revenue to the carriers, but even greater intangible losses to the communities as well. This is particularly the case where a city depends entirely on local service air transport for business growth and has only token rail service (or none at all) to link it with major business centers.

One of the best examples of the dilemma—probably the most extreme—is the experience at Allegheny Airlines, now emerging from a record winter business despite being plagued by the worst ATC problem in its history.

During the first three months of this year, while flying 23.5% more passenger-miles than in the like period of '55, Allegheny suffered a total of 3,179 ground delays and 2,971 in-flight ATC holds.

Together, these added up to 936 hrs. 19 mins. of extra flying or the equivalent of the utilization of two of the carriers 20-plane fleet. More significant, it means that 10% of Allegheny's aircraft spent full time *waiting out ATC delays.*

An analysis of the overall delay picture pinpoints the problem area more closely. Three of its key en route stations—Williamsport, Bradford and Erie, Pa.—accounted for 30% of the total number of delays and 32% of the wasted operating time.

Why? Not one has a control tower. Williamsport and Erie have Insacs (CAA communications stations) and Bradford has one under way, but these do little to ease the ATC delay picture.

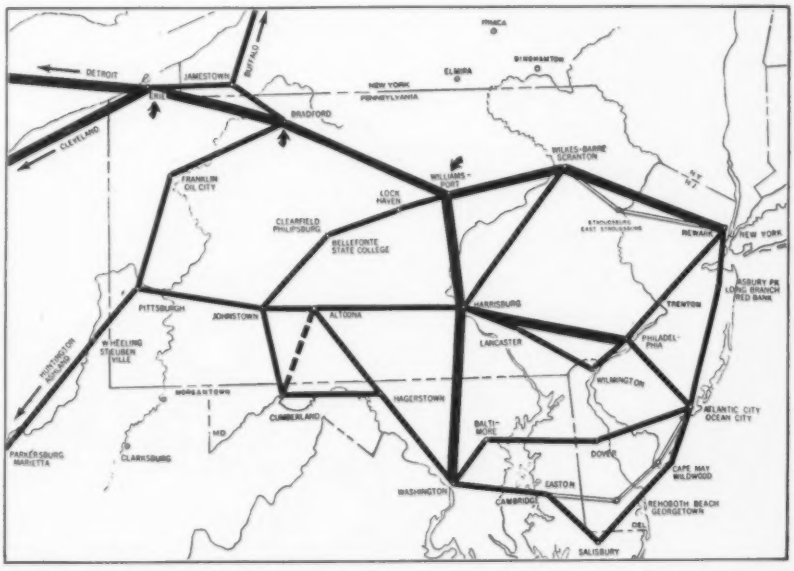
When IFR weather sets in, Allegheny has to call Cleveland from Bradford to clear an airplane for takeoff. In effect, it is paying "user charges" for ATC facilities today, as it maintains its own AT&T drop line between the two cities in an attempt to speed up operations.

At Williamsport, it's a case of getting clearance from New York ARTC, an almost impossible task when traffic control personnel there are tied up with a much more critical problem in the immediate area of New York.

Take a typical Detroit-to-Washington flight several weeks ago. Trip 370 departed Detroit on time, experienced a 1 min. ATC delay at Erie, 23 min. between Erie and Bradford, and six more minutes on the ground at Bradford.

Another ATC hold added 53 minutes between Bradford and Williamsport. Three minutes on the ground at Williamsport, 10 minutes in flight to Harrisburg, six minutes ground delay at that station, and finally, 27 minutes Harrisburg-to-Washington, brought the ATC time toll to 2 hrs. 9 min. extra on a normal 3 hr. 29 min. flight.

Multiply this experience by the number of "bad" days hampering Allegheny's operation during January through March, 61 to be exact, and the toll in loss of revenue and increased operating expense adds up. According to David L. Miller, v.p.-operations an estimated 9,883 passen-



LOW-ALTITUDE OPERATIONS over Allegheny's route (map, above) are conducted beneath heavily traveled Chicago-New York and Pittsburgh-New York airways. Arrows mark points where shortage of ATC facilities is causing most delays.

gers were lost, sapping Allegheny's revenue intake by some $108,000.

The direct operating cost of the increased flying time, using figures recognized in CAB's standard system of accounts, amounted to $92,070 out of pocket.

With this type of experience, it becomes quite obvious that local airline service can hardly survive many more winters of bad-weather operation. There is little to offer in the way of passenger service if flights depart end-of-the-line terminals only to be delayed excessively en route and force further delay or cancellation of turn-around flights at the opposite end of the route.

And Allegheny isn't the only airline affected. At Erie, for instance, Capital, Lake Central and Mohawk are also facing the same situation. Although a new terminal is to be commissioned here in November, Allegheny officials expect it will be sometime in 1958 before approach control services are installed—another winter of delays.

The irony of the situation, as they see it, is, assuming a control tower is installed, each of their three ATC bottlenecks immediately would qualify for approach control services, although they can't right now meet the criteria for a tower.

What approach control does for these points is take the problem of "remote" control out of the hands of the distant Cleveland and New York centers and delegate it to the local tower. In Allegheny's case, operating underneath the most heavily travelled airways in the world, it appears the only answer.

And it is no simple matter of delaying passengers trying to make interline connections with trunk airlines, Allegheny's Miller points out. Today the carrier's percentage of on-line business heavily overshadows interline traffic, putting the burden of delay on local businessmen attempting to travel to a nearby industrial center and return the same day.

The record bears this out. At Bradford, one of the trouble spots with no railroad service, traffic is 74.7% on line, only 25.3% interline. At Williamsport, with only token RR service, it's 80.4½ on line, Wilkes-Barre/Scranton 83.2%, Harrisburg 74.5% and Jamestown 67.8%.

This present plight of the locals also raises an interesting point with respect to airways user charges now being promised to Congress by CAA before the current session ends. Assuming the charges will be tied to an aviation gasoline consumption index, will local carriers be asked to pay a growing share of the bill flying out ATC holds, while cities they serve get no benefit in the form of ATC facilities?

Allegheny officials take no issue with the need for monies to solve the major terminal ATC problem. The only point they raise—and obviously a valid one—is whether the local service industry should be starved by lack of ATC facilities just because the cities they serve can't match some magic number of airline movements.

How ATC delays hit local airline operations

One of the most comprehensive studies of effect of ATC delays on airline service is that conducted by Allegheny Airlines for January through March this year. Table emphasizes how the effect at small stations far overshadows that of so-called high-density terminal areas.

Here is breakdown of ground and flight delays by number and total time:

		Ground delays		Air delays	
		No	Hrs./Min.	No.	Hrs./Min.
Three intermediate points					
Bradford	Jan.	185	21:07	120	19:32
	Feb.	176	26:19	142	26:49
	Mar.	114	18:06	100	19:51
	Total	475	65:32	362	66:12
Erie	Jan.	139	16:51	93	12:10
	Feb.	112	16:22	90	14:50
	Mar.	88	10:39	62	11:19
	Total	339	43:52	245	38.19
Williamsport	Jan.	66	8:33	35	6:36
	Feb.	100	17:40	60	15:20
	Mar.	103	14:26	78	20:48
	Total	269	40:39	173	42:44
Note: Grand total of three points is 1,863 ATC holds for 297:18 hrs./min.					
Three very high density points					
Newark	Jan.	60	9:03	78	23:10
	Feb.	80	15:15	89	28:22
	Mar.	90	16:35	108	38:00
	Total	230	40:53	275	89:32
Washington	Jan.	9	1:49	7	2:34
	Feb.	37	6:53	44	13:56
	Mar.	25	3:28	34	9:26
	Total	71	12:10	85	25:56
Pittsburgh	Jan.	47	3:54	124	17:34
	Feb.	42	3:35	85	12:33
	Mar.	32	3:21	77	13:31
	Total	121	10:50	286	43:38
Note: Grand total of three points is 1,068 ATC holds for 222:59 hrs./min.					
Allegheny's system total which includes points not shown above follows:					
All points	Jan.	1,013	107:27	941	151:44
	Feb.	1,143	150:55	1,034	194:38
	Mar.	1,023	131:24	996	200:11
	Total	3,179	389:46	2,971	546:33
Note: Grand total of all operations is 6,150 ATC holds for 936:19 hrs./min.					

Flying Tiger line gets latest Super Connie

First Lockheed Model 1049H Super Constellation approved for a 2,500-lb. increase in the maximum gross takeoff weight to 140,000 lbs. has been delivered to the Flying Tiger Line, which currently is establishing the new Super Constellation equipment on its transcontinental air freight routes.

Boost from the originally certificated weight of 137,500 lbs. is accomplished through installation of Curtiss-Wright's new EA engines which develop 150 hp more for cruise and an additional 100 hp for METO.

For the Tiger's domestic freight schedules, no increase in the 43,000-lb. payload is obtained, because the carrier is up to the zero fuel limit, but the new takeoff weight adds about 300 miles more range by allowing 2,500 lbs. more fuel. On over-water schedules, such as San Francisco-Honolulu, however, the Tigers will be able to up payloads from 37,000 to 39,500 lbs.

Maloy to head new CAA office

R. B. Maloy, former CAA aircraft engineering advisor in Paris, has been named acting director of its Office of International Cooperation, a new office which replaces the International Region established after World War II.

Maloy will replace A. T. Callanan, who has headed the International Region since last September. Callanan returns to his regular post as head of CAA's Executive Controls Staff.

Replacing Maloy in Paris will be Robert B. Meyersburg.

Aircraft overhaul: growing business in Costa Rica

by Anthony Vandyk

SAN JOSE, COSTA RICA—Airframe and engine overhaul is rapidly developing into an important adjunct to the economy of this Central American republic, hitherto largely supported by banana and coffee production.

Located in San Jose, capital of Costa Rica, is the largest independent aircraft and engine overhaul organization in Latin America, Servicios Aerotecnicos Latino Americanos—SALA.

SALA's NEW HANGAR at San Jose's El Coco airport, now being completed, is the largest structure of its kind between Brownsville, Tex., and Lima, Peru. It offers 128,000 sq. ft. of floor space and was specially designed to meet SALA's requirements.

Although affiliated with no airline, SALA has built up its business from commercial customers but now military customers are assuming increasing importance. In dollar volume one-third of SALA's business is now military. An increasing percentage of the military business comes from the U.S. Air Force's Caribbean Air Command. Its Commander, Major General Truman Landon, has described SALA's IRAN work as superior to the performance of depots in the U.S.

SALA is currently overhauling one USAF C-47 per month for Caribbean Air Command on a continuing basis and is also frequently entrusted with repair and overhaul work on other U.S. military aircraft. Recently SALA completed a contract for work on U.S. Army Bell H-13 helicopters. It is now doing IRAN work on 12 L-19s.

Major expansion in works

A major expansion of SALA's military contract operations is expected in a few months' time when the company moves to a new facility now being completed at El Coco airport. This field is in process of replacing Sabana as San Jose's air terminal. Sabana is a grass field unsuitable for aircraft heavier than C-46s. Consequently SALA has been unable to accept work on large aircraft.

The El Coco field is suitable for the heaviest of planes and therefore there will be no restriction on the type of work that SALA can perform. The company has been a CAA-approved foreign repair station since 1952 and already is certificated to perform work on DC-4 type aircraft. It would seem logical that one of the first results of the move to El Coco would be the award of Caribbean Air Command IRAN contracts for C-54 aircraft.

The facilities of El Coco are new and were designed expressly for aircraft engine overhaul. The main hangar measures 440 ft. by 216 ft. and has two 100-ft. by 220-ft. lean-tos. It was erected by an Italian firm. The facility is being financed by a loan from the Bank of America. Total cost will be in excess of $600,000.

SALA has a 45-year exclusive occupancy contract for the new hangar. It will pay an annual rental for use of the El Coco but the first seven years of occupancy will be rent-free in exchange for the sale of the Sabana facility to the Costa Rican government.

SALA, incidentally, is a Costa Rican corporation with U.S. citizens holding the majority of stock. The Costa Rican government has an interest in the company (it is to increase its holding to 10%) and Costa Rican citizens have small holdings. Main stockholder is Grant Foster, president of the company, a U.S. construction tycoon who has become an aviation enthusiast.

Second largest stockholder is Robert Anson, general manager of the company, and incidentally, the man who does all its test flying. It is Anson who has been largely responsible for SALA's success. Anson had been a commercial airline pilot in Central America for many years when in 1948 he and two other pilots bought the shops and overhaul facilities of the Taca Airways System which were established at Sabana in the thirties. The other two later pulled out after several difficult and profitless years at Sabana.

It was not until Anson became general manager that the facility was organized on a truly efficient basis and new business was developed. SALA moved into the black for the first time in 1956 and expects to continue making profits.

Anson believes that the best maintenance is the cheapest maintenance in the long run. SALA's customers agree.

Offers substantial savings

Despite its philosophy of nothing but the best, SALA is able to offer operators substantial savings on the cost of the work as compared with U.S. prices. The USAF Caribbean Air Command has informed SALA its work costs less than 50% of the price in the U.S. Average cost per manhour in SALA's shops is about $2.50, reflecting the lower standard of living of Costa Rica and the efficient cost-cutting methods introduced by Anson.

Nonetheless, the 450 workers on SALA's payroll receive remuneration higher than the average paid to skilled workers in Costa Rica and constitute a happy and stable labor force. All the company's top officials are fully acquainted with U.S. standards and procedures and make frequent visits to the U.S. to up-date themselves on new developments. SALA executives are frequent visitors to such facilities as United Air Lines' overhaul base at San Francisco and the USAF's Air Materiel Command.

SALA has to be an efficient and thoroughly up-to-date organization in order to deal with the multifold demands made on it. In addition to performing engine and overhaul work on transports for many Latin American airlines and air forces the company

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Here is a list of some of the aircraft on which SALA has performed major work recently: C-46, DC-3, Cessna 170, Beech Bonanza, Aero Commander, Piper Cub, Beechcraft AT-11, Bell H-13 helicopter, Cessna L-19, De Havilland-Canada L-20 Beaver, Lockheed Lodestar. A list of the airlines that have contracted work to SALA in recent months is equally revealing — LACSA (Costa Rica); COPA (Panama); AVE (Costa Rica); PLUNA (Uruguay); Riddle (U.S.); Avianca (Colombia); Avensa (Venezuela); La Nica (Nicaragua); and SAHSA (Honduras).

Among the military customers that have used the facilities of SALA for aircraft work are, in addition to the USAF and the U.S. Army, the air forces of the following countries: Ecuador, Bolivia, Colombia, Costa Rica, Nicaragua, Cuba, Guatemala, and Salvador.

SALA is as active in the engine overhaul field as it is in aircraft work. The main engines it overhauls are the R1830 and the R2800. In a typical month SALA overhauls about 12 engines. It also overhauls propellers and all components and accessories including radios. In fact there is no aviation overhaul work that SALA cannot perform.

In salvage business, too

In addition to the overhaul servicing and conversions ("VIP" plush jobs are a specialty) of aircraft, SALA does a substantial business in repair work and in crash investigation for insurance companies. It is the only organization in Central America that specializes in the salvaging of wrecked aircraft. It will rebuild planes up to 75% destroyed.

On occasions where the insurance company has not deemed the aircraft worth salvaging SALA has bought the wreckage and rebuilt it for sale. Right now it is rebuilding a DC-3 that crashed in a remote spot in Central America. It will be sold to a European government.

Such extensive work requires not only considerable technical competence but also a large quantity of new parts. Locating and procuring spare parts for all types of aircraft, engines and other equipment is one of SALA's specialties. The company has its own office in Miami, an important factor in obtaining parts quickly and cheaply.

SALA's specialization in this field has led several Latin American operators to contract with the company as their spare parts procurement agent in the U.S. This has resulted in substantial savings of money for the operators concerned.

ABOUT TWO-THIRDS of SALA's overhaul work is performed for airline customers notably including LACSA, flag carrier of Costa Rica. Several of these LACSA planes are seen at the Sabana base, soon to be vacated.

SALA will become even better known than it is today as a result of a decision to establish an Inter-American mechanics training school of San Jose. This is a project under the U.S. International Cooperation Administration's Point 4 program. Acting on behalf of ICA, the Civil Aeronautics Administration has entered into an agreement with the Costa Rican government for the establishment of the school at San Jose.

Three-way cooperation

The Costa Rican government, in turn, has subcontracted the operation of the school to SALA. Equipment for the school is furnished by ICA. Scholarships to the school are given by ICA to mechanics of Spanish-speaking Latin American countries. The first course started on April 1. It is expected that this will be a continuing and expanding program and it will serve to educate Latin American mechanics in the latest overhaul and maintenance methods.

Among the many expansion programs under study by SALA is the manufacture of aircraft. The company has had serious negotiations with Jack Frye regarding possible assembly of the Safari DC-3 replacement. There have also been discussions with a European company for the production of a light helicopter at El Coco. The new facility has been designed so that aircraft manufacture can be undertaken there if needed.

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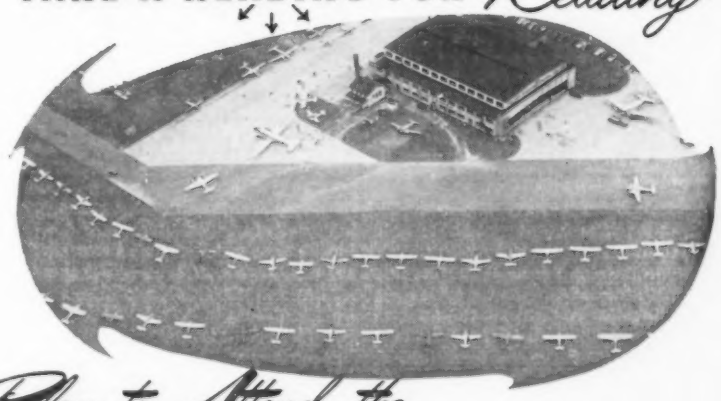

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AA plans to develop travel agents into promotion-minded 'dealer' organization

Serving notice that it is counting heavily on vacation and pleasure travel to fill the increased capacity of its jet fleet, American Airlines has started a sweeping program to develop its more than 2,500 travel agents into a "powerful organization of dealerships."

To prepare these 2,500 "salesmen" for participation in the jet age seat-selling campaign, AA is:

Conducting a series of 73 "dealer workshops" for travel agents in 35 cities. This will be largely completed by the end of May.

Launching a new program of national advertising and promotional material designed "to support the role of the travel agent in the public mind."

Undertaking a five-year program to support agents with advertising, promotion, direct mail and point-of-purchase merchandising.

Giving its sales representatives all over the country an advanced course in travel agency operation to enable them to assist the agent in market analysis, promotional planning and direct mail techniques.

AA's plan to develop this "dealer" relationship with agents was previewed last winter in a little-publicized speech by president C. R. Smith at the American Society of Travel Agents' convention.

Said Smith: "We aim at an air travel market of 35 billion passenger-miles for 1961 . . . But the inter-city automobile market of today, not tomorrow, is about 500 billion passenger-miles . . . This is a market which can be tapped by mutual and effective cooperation and effort.

"Entirely necessary to the project are the thousands of retail outlets, the travel agencies . . . They are the most important source of merchandising effort for the exploitation of the relatively untapped field of automobile travel, and a conversion of the long distance and middle distance areas of that market to air transportation . . .

"Our principal business is manufacturing; your principal business is selling the product manufactured . . . It was the manufacturer-dealer relationship which put a refrigerator in every kitchen and an automobile in every garage. The manufacturers used an aggressive dealer organization to accomplish that merchandising miracle. The blueprint is there."

The workshop concept and the dealer program are based on a marketing consultant's study of the business relationship between AA and the travel agents.

Walter Johnson, AA's v.p.-passenger sales, said the company "believes that the growth of air travel in the immediate future depends largely on encouraging more Americans to use the airplane for their vacation and pleasure travel."

Outlined at the workshop sessions will be AA's new "domestic air vacation" program.

"One of the important shifts in American business in the last decade has resulted in a high turnover-low unit profit formula for prosperity," Johnson said. "The areas of opportunity in the sale of domestic vacations by air can create this same kind of condition for the travel agent."

AA's workshop program will provide a review of market analysis, successful selling techniques, merchandising methods, improved operating efficiency, customer relations techniques and general travel services. AA said all have been analyzed to increase revenues for the agent at a minimum increase in overhead costs.

Concluded Johnson: "A high degree of the success which lies ahead in the coming jet age will depend upon how well the agent prepares to capitalize on this opportunity for expansion, growth and future profit."

Distinctively Different...
New York's friendly hotel... minutes to Grand Central, 5th Ave. shops, theatre district. All outside rooms; radio, TV, circulating ice-water, tub and shower! Everything to make you feel "at home".
Home of the famous 'Hawaiian Room'
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Circle No. 31 on Reader Service Card.

United announces a superior new low-cost service...

DC-7 CUSTOM COACH

FASTEST LOW-COST NONSTOP BETWEEN NEW YORK AND SAN FRANCISCO

- **Delicious hot meal** (not a snack), served on convenient fold-down tables.
- **Reserved seats: new comfort arrangement.** Exclusive on United's DC-7 CUSTOM COACH, new seating arrangement provides more room for "6-footers," more aisle space, extra spaciousness and comfort for everyone. You choose your own reserved seat at check-in time, for your added convenience. Relax in the luxury of colorful, new interiors.
- **Nation's fastest airliner,** the DC-7, now makes six-mile-a-minute service available at economy fares.
- **For reservations** or for information, call United or an authorized travel agent.

FARE: ONLY $99 plus tax *(meals optional at nominal price).*

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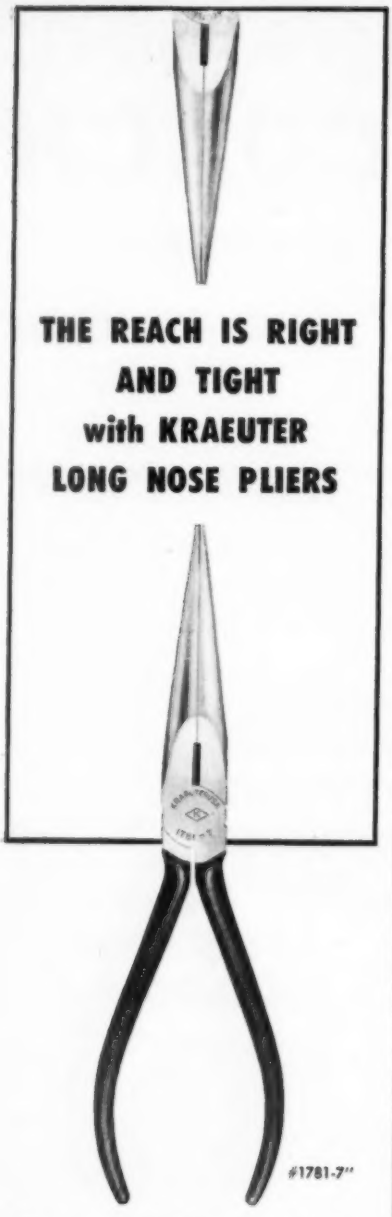

You can depend on reachability and cutting power with Kraeuter's #1781 Long Chain Nose Pliers. And your reach will be tight and sure for those hard-to-get-at jobs with the extra long milled jaws of these pliers.

Buy the right line. It's the Kraeuter line for electronic and electrical work. Kraeuter tools are unreservedly guaranteed.

Send for catalog #25 illustrating complete Kraeuter line.

BUY THE FINEST
BUY KRAEUTER
BUY AMERICAN

AS MODERN AS TOMORROW

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FOR 100 YEARS THE FINEST IN HAND TOOLS 1860-1960 • NEWARK, N. J.

Circle No. 32 on Reader Service Card.

Air Traffic Conference adopts new ad code: a clamp on 'fastest' flights, 'lowest' fares

Domestic airlines will no longer be able to advertise the "fastest" flights or the "lowest" fares unless their flights are actually faster than any others on the route and their fares are actually the lowest.

These practices are prohibited under a new advertising code adopted by the Air Traffic Conference.

Instrumental in bringing the matter to a head was last year's complaint filed with CAB by Delta Air Lines, charging Eastern with "unfair and deceptive practices and unfair methods of competition" for advertising "fastest" flights and "lowest" fares.

Delta said that its services were just as fast and just as inexpensive. EAL in turn charged Delta with advertising "lowest possible air fares" and referring to its DC-7s as the world's fastest, finest airliners."

The question has been whether a carrier should advertise "fastest" when it means "none faster" and "lowest" when it means "none lower." CAB has not rendered a decision in the Delta-EAL case.

The new ATC code states that "in advertising, it shall be the aim of the members to represent their individual interests or services in a manner which will not reflect discredit, either implied or stated, upon the interests or services of another member. In all respects, each member shall conduct its advertising program with a view to maintaining the highest ethical competitive standards for the air transport industry . . .

"No member shall advertise a flight time which is less than the flight time shown in its official schedules . . .

"No member shall advertise a fare which is lower than the fare shown in its officially filed tariffs, and further, shall not advertise the 'lowest' fare between any two points unless such tariffs list a fare which is lower than that shown in the official tariffs of any other member for service between the same points . . .

"No member shall advertise the 'fastest' service between any two points unless its official schedules reflect a block-to-block time between such points which is less than the block-to-block time shown in the schedules of any other member serving the same route segment . . ."

High court ruling spells finis for Trans American

Civil Aeronautics Board's revocation order against the Trans American Airlines group of non-scheduled airlines has been upheld by the U.S. Supreme Court. Accordingly, the CAB order, under which Trans American must wind up its affairs, takes effect at 12:01 a. m., June 7, 1957.

CAB ruled against what it termed an "unlawful combine" on July 1, 1955. Subsequently, the CAB action was stayed pending litigation in the U.S. Court of Appeals in Washington. That court unanimously upheld the CAB action in a decision late last year.

Thereupon, Trans American secured a further stay as it filed to have the Supreme Court review the Appellate Court's decision. Technically, last month's action by the High Court was a unanimous refusal to review.

The CAB proceeding was started in 1953 when the group was known as North American Airlines. It embraces four non-scheduled lines: Twentieth Century, Trans National, Trans American, and Hemisphere. As of June 7, they will be forced to surrender the letters of registration which constitute their economic authority to operate.

In addition, the four individuals who served as principals or partners of the "combine" are directed to cease and desist from unlawful air transport activities. Those individuals are Stanley D. Weiss, James Fischgrund, Jack B. Lewin and R. R. Hart.

Trans American, meanwhile, had started to phase out its operations prior to the Supreme Court ruling. Biggest single factor in the phase-out was an agreement under which TAA's seven Douglas DC-6B aircraft were leased to Eastern Air Lines for a five-year period.

Aircoach Assn. sues rails on anti-trust charges

Aircoach Transport Association and four individual non-scheduled airlines have filed a $45-million antitrust suit against 42 major railroads they accused of "monopolizing the commercial transportation of military personnel."

ACTA claimed damages to it and the four airlines of $15 million and sued for "treble this figure under antitrust laws." In addition to the railroads, suit names two passenger traffic bureaus as defendants: Trunk Line Central Passenger Committee of the Traffic Executive Association—Eastern Railroads, New York and the Western Military Bureau, Chicago.

Filing was in U.S. District Court, District of Columbia. ACTA said "illegal economic warfare by the railroads has forced 17 supplemental airlines out of the domestic military group passenger traffic market."

The group charged that railroads grant discounts from "10% to 50% and more" when competing with airlines for military business but charge the maximum price otherwise.

How not to run an airline conference

by Eric Bramley

There are red faces around the headquarters of a certain major airline. Inasmuch as its personnel must attend many meetings and conferences, this carrier thought it would be a good idea to publish a manual containing information on how to conduct a meeting so that everyone gets the most out of the sessions. The manual points out that a relaxing coffee break is a good idea. But, it adds, a time limit should be placed on this intermission and the chairman should make certain that the meeting resumes promptly. In other words, it says, "run your meeting with railroad precision."

Quote of the month, from the Delta Digest, on the need for a fare increase: "You can't pay for five million dollar airplanes with five-cent fares when that nickel is only worth 2½ cents."

Here's something to watch. United Air Lines has been doing an all-out sales promotion job on its deluxe "Red Carpet" service. A UAL employe wrote president W. A. Patterson: "Recently a call to American Airlines was answered thusly: 'American Airlines, now offering direct Red Carpet service between Detroit and Los Angeles.' To say the least, we were surprised. Heretofore we had considered 'Red Carpet Service' a UAL trademark. Any comments " Patterson's answer: "We feel we have a valid copyright on 'Red Carpet Service.' However, American and others have challenged that right. It is something that probably will be settled by the courts. In the meantime, we will continue to use it."

We had predicted, with some confidence, that the Air Traffic Conference meeting in New Orleans would be unable to agree on a non-show penalty. The prediction looked good even through the first two days of the meeting. But in the end we were wrong and so were a lot of other people. Agreement on the $3 penalty was due to several factors including (1) presidents of the Big Four said in advance that a penalty was okay, (2) many compromises, (3) for the first time, the airlines didn't get bogged down in petty details. Local service lines accepted the plan, although $3 is 36% of a Washington-Harrisburg ticket whereas it's less than 2% of a New York-Los Angeles fare. Much credit is due Stu Tipton, ATA president, who has spent lots of time on ATC matters and who worked hard for an agreement. Also Bob Turner, ATA's v.p.-traffic, and Walt Sternberg, v.p. of National and chairman of ATC's no-show committee. The penalty plan may need some revising and refining after it's been in operation awhile, but in general there's optimism that it will work.

During the ATC meeting, more than 100 airline sales officials paid tribute to Ray Ireland, who retires Aug. 1 as United Air Lines' v.p.-traffic administration after more than 31 years with the company and its predecessors. The tribute was in the form of a testimonial dinner, complete with speeches and gifts, and Ray was elected honorary lifetime president of ATC. Among those traveling to New Orleans especially for the affair was Charles Beard, president of Braniff, whom Ray hired in the late 20's to manage the airlines' consolidated ticket office in Chicago. Seldom has a man been held in such high esteem, both by his fellow workers and by his competitors, as is Ray Ireland. We join in wishing him the best of everything.

Odds and ends: We saw a man claim 25 big pieces of baggage at New Orleans' Moisant International Airport. Quite a bill for excess . . . New CAB Member Louis J. Hector was sworn in by Judge George Washington, said to be the most direct living descendant of the first President . . . A Pan American stewardess applicant, filling out the employment form, was seen to hesitate when she came to the part inquiring about personal description. The supervisor, checking the form later, decided the hesitation must have occurred over the question asking about the "build" of the applicant. Here the gal had finally written: "Pretty nice!" . . .

Sales, Traffic, Promotion

Here's what was spent in 1956 on TV spot commercials: *National*, $260,930; *Delta*, $186,940; *Eastern*, $219,000; *Western*, $118,540; *Northwest*, $63,750; *Pan American*, $63,800; *Piedmont*, $35,100; *Trans American*, $82,690; *Lufthansa*, $24,380, and *Scandinavian Airlines System*, $26,160 . . .

Central Airlines salesmen are now wearing white pocket handkerchiefs with "Fly Central Airlines" stitched on the edge in eye-catching red . . . New **West Coast Airlines** gimmick is a small jigsaw puzzle which, when put together, conveys the message: "Travel problems are no puzzle if you fly West Coast" . . . Allegheny Airlines' guest hostesses from Air France are now beginning to return home. AAA now plans to recruit girls only in the cities it serves . . .

American Airlines is making available small pet kennels for sale to its customers. They can be sold only to people shipping pets as airfreight or excess baggage, and won't be rented or loaned. AA said it adopted the plan because it found that purchase price of the kennel together with the excess baggage charge is about the same for distances up to 750 miles as renting a kennel. Over 750 miles, it's more economical. Kennels are made of wood and finished in clear varnish. Two sizes are available. They're for sale at the three New York airports, Boston, Chicago, Los Angeles, San Francisco, Dallas, Detroit, Cincinnati and Washington . . .

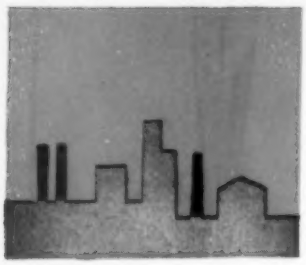
Delta Air Lines' $200,000 advertising program now under way on Millionaire Dream Vacations highlights the travel agent. A boldface 400-line ad describing the vacation folders omits Delta's phone number and refers only to the agent. Same goes for a series of 300-line ads featuring Miami Beach, Caribbean and Nassau. Company has scheduled four-color pages in national magazines and business publications and over 550 ads covering 35 newspapers in 27 cities . . .

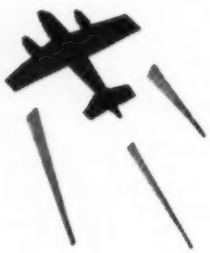
TWA has devised a "translator" for use on international flights. It's designed to provide communication in any one of six languages besides English (German, French, Italian, Spanish, Portuguese and Greek) between passengers and cabin attendants. Contains lists of phrases in all these languages . . .

An air-van service providing fast shipment of household goods has been started by **United Air Lines** and North American Van Lines. North American makes the pickups and deliveries and UAL moves the goods on its DC-6As as "reserved air freight." Fiberboard containers with 1,000 lbs. capacity are being used . . .

United Air Lines has added another "men only" flight between New York and Chicago. Designated the "Advance Executive," flights leave both cities daily at 4:30 p.m. The "Executive" leaves at 5 p.m. In addition to steaks, etc., passengers receive a "gift of the month," such as a cigarette lighter or billfold. There's a $3 extra fare . . .

Braniff Airways now has aboard its planes copies of a comic book, "Wings of Adventure." It's a 16-page full-color book, telling the story of two teen-agers whose graduation present is a Braniff trip to South America. Hostesses pass them out to youngsters.





EASTERN SEABOARD OR TEXAS GRASSLANDS *Esso is there . . . at 600 airports from Maine to Texas!* How convenient business and pleasure flying has become! Now, when you plan a trip, the least of your worries is having the plane properly serviced – thanks to the special effort Esso Aviation Dealers are making to save you time and trouble. Your Esso Aviation Credit Card, for instance, allows you to charge not only gasoline, oil and lubrication, but tire and battery service, landing fees, overnight in-transit storage and most minor emergency repairs as well. Enjoy your next trip . . . land where there is an Esso Aviation Dealer.

FREE TO PILOTS! See your nearby Esso Aviation Dealer for your free copy of "The Esso Co-Pilot"–a complete directory of Esso Aviation Dealers.

Esso

TRANSPORT TRENDS

Time has now become the most important factor in CAB's investigation of seven domestic trunklines' proposal to hike fares 6%. Forced by law to decide by September 30, CAB has "deferred" all issues in the case except a "yes or no" answer on the fare increase tariffs. If the case moves faster than expected, the Board could reactivate the issue of a possible enforced fare cut. Meanwhile, the General Passenger Fare Investigation, which embraces all fares of all domestic trunks, has been indefinitely shelved because of (1) the immediate nature of the 6% fare increase request, and (2) shortage of CAB personnel to handle the two cases simultaneously.

Time is also important in local service airlines' hopes for legislation this year under which the government would guarantee loans for re-equipment purposes. CAB has drafted legislation, but Commerce and Treasury Departments are giving it the "fine-tooth comb" treatment. Stiff opposition, of course, would make it difficult to get anything through Congress before the mid-summer recess.

Representatives of local and territorial airlines will meet in Washington this week to push their cause. The issue will assume significance equal to that of permanency legislation of a few years ago.

One alternative that has been mentioned to the CAB-proposed guaranteed loan plan is an amendment to the Bankruptcy Act to authorize equipment trust certificates. However, local lines take a dim view of this approach.

1957 may be the year in which domestic airlines for the first time perform more passenger-miles than the railroads. Air has been gaining steadily. Last year, passenger-miles of trunk and local service lines jumped 12.6% to 22.4 billion. Railroads, excluding commutation passengers, dropped 1.7% to 23,349,000,000 passenger-miles in first-class and coach. Among those who think air can overtake rail this year is CAB Chairman James R. Durfee. He points out that from 1947 to 1956, when the total common carrier market was declining from 69.9 billion passenger-miles to 62.3 billion, airlines increased their penetration of this market from 8.7% to 35.8%.

It's still a toss-up whether Congress will get around to considering airways user charges at this session. CAA's report on user charges has been forwarded to the Commerce Department, but the latter hasn't yet submitted its views to Congress. In view of the time element, some observers say Congressional hearings are a "possibility, but doubtful." On the other hand, President Eisenhower's strong statement in support of legislation might speed things up. The President said a user charge is a way "to relieve the general public of having to subsidize governmental services affording special benefits."

Some airline experts in the Far East believe Japan Air Lines may be the first non-Communist carrier to fly to Peking. Others are known to be eyeing the prospects and the timing, but JAL might lead the way.

Americans have been cautioned about flying Air India to Hong Kong. The weather alternate for this airline is Canton, in Red China. It hasn't happened yet, but U.S. citizens could be put in quite a spot by landing involuntarily in Red China.

INDUSTRY

Combined sales of top airframe manufacturers for 1956 exceed $5.6 billion, near peak of World War II

Combined sales of the country's 12 largest airframe manufacturers reached $5,637,100,000 in 1956. This is 9% above the 1955 level, but $129 million short of the World War II peak of 12 top airframe builders, the Aircraft Industries Association reports.

The 1956 earnings dropped 12%, from $178.8 million in 1955 to $156.5 million.

The report said that major companies are continuing to re-invest a major portion of their earnings in new facilities. During the past two years, the 12 companies have plowed back about 60% of their profits to support expansion.

Total military and civilian backlog of the 12 companies climbed from $9.9 billion at the end of 1955 to $11.2 billion at the end of last year. This includes $2.4 billion for commercial transport planes.

The 12 largest airframe firms last year in terms of sales were: Bell, Boeing, Chance Vought, Douglas, Fairchild, Grumman, Lockheed, Martin, McDonnell, North American, Northrop and Republic. Convair Division of General Dynamics would normally be in the group but no income statement is available isolating its operations from those of other GD activities.

Spending for aircraft, missiles, facilities, etc. likely to exceed Administration's estimate by $2 billion

Spending for military aircraft, missiles, drones, production facilities and related items is running ahead of Administration's estimate.

During February, Air Force and Navy expenditures for aicraft, missiles and related items was $856 million, highest month of the fiscal year. Cumulative outlays for the first eight months of the fiscal year stand at $6,022 million. Air Force share of these expenditures is $662 million in February and $4,694 million for the eight months. Navy spent $194 million and $1,328 million.

Defense Department is expected to spend close to $38 billion before the fiscal year is out, $2 billion over the Administration's January estimate when the 1958 fiscal budget was submitted to Congress.

Pentagon is blaming unexpected high rates of delivery, faster billing by manufacturers, greater progress than expected in missiles, and recent wage and price increases.

During February Air Force placed orders totaling $505 million, bringing July-February totals to $5,174 million. Navy placed $150 million in orders in February upping eight-month total to $1,611 million.

Military electronics spending hits $15 billion

Military electronics spending during the 1950-56 period has amounted to more than $15.1 billion, according to the Radio-Electronics-Television Manufacturers Association.

RETMA analysis shows that current Department of Defense spending for electronics equals or exceeds Korean War levels of electronics expenditures.

RETMA arrives at the figures through use of a new formula developed by the Marketing Data Department. According to the formula, total Defense spending for electronics for the fiscal periods beginning 1951 through the second quarter of 1957 (in millions):

Aircraft, $5,540; ships and harbor craft, $498; combat vehicles, $876; support vehicles, $75; guided missiles, $1,783; electronics & communications, $4,391; research & development, $1,498; miscellaneous, $500; total, $15,181.

The first half of the current fiscal year military electronics expenditures (in millions):

Aircraft, $483; ships, $36; combat vehicles, $31; support vehicles, $1; guided missiles, $464; electronics & communications, $366; research & development, $141; miscellaneous, $18; total, $1,540.

During first quarter of current fiscal year, detailed above, the total spent for electronics is 7.6% of total military spending, and 9% of total spending went for electronics in second quarter. Second quarter spending exceeded total spent by Defense for electronics in any single quarter since 1951.

Thor detonated within minute of launching

A Thor medium range ballistic missile was detonated less than a minute after launching during a flight test recently at Patrick Air Force Base, Fla.

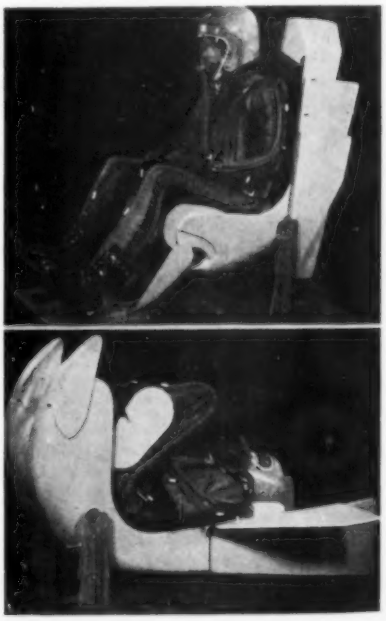
The 1,500-mile missile was exploded by a range safety officer who feared it was leaving course and might fall on the mainland rather than in the sea.

Despite the action, the flight was reported 100% successful from a test standpoint. Complete telemetry was achieved during the short flight.

Convair tests bobsled ejection seat design

Rocket power ejects pilot horizontally in aerodynamically contoured seat under development by Industry Crew Escape Systems Committee. The seat rotates 90° into supine position for launching into airstream.

Pilot's legs are securely positioned



against his chest by foot supports and contoured seat pan. Miniature models have been tested in windtunnels and full-scale versions will soon undergo extensive tests at the Air Force rocket sled tracks at Edwards Air Force Base, Calif.

W. B. Harwell, Convair manager of production flight, sits in device.

Boeing plans advanced model of jet tanker

Boeing Airplane Co. is planning an advanced model of the KC-135 jet tanker to refuel advanced aircraft. Company officials said tankers will be needed for new generation of manned fighters, B-47 and B-58 bombers.

Pan American, AA lead race for Mexican routes

Pan American World Airways and American Airlines have assumed strong positions as the potential United States carriers to operate the New York-Mexico City and Chicago-Mexico City routes, respectively. But final selection of carriers still remained to be decided by CAB.

Pan American was the choice of CAB Examiner Edward T. Stodola to operate the New York/Washington-Mexico City route for which Eastern Air Lines is the other active applicant. American voluntarily withdrew from that case recently to concentrate its efforts on securing the U.S. designation to operate Chicago-Mexico City services. Braniff Airways is competing with AA for the Chicago route.

Stodola said PAA is "the only applicant which can effectively participate in the Europe-Mexico City market and its selection as the carrier needed for the proposed nonstop service is necessary to strengthen U.S. flag aviation over the North Atlantic." The case is expected to be decided by CAB late this month.

American and Braniff, meanwhile, are involved in a two-part struggle for the Chicago-Mexico City route. First part deals with a so-called "interim" designation to operate portions of the route pending decision by the Board on the question of which of the two will get a full-term designation.

AA's position in the "interim" case is enhanced by the fact that it currently operates a Mexico City service through Dallas. Braniff, though certificated to Mexico City, has never had an opportunity to activate the certificate.

A CAB decision in the "interim" case was expected momentarily. But a decision on the full-term investigation must await normal CAB procedural steps such as hearings, oral argument, etc.

X-17 flies 9,000 mph for new speed record

The Lockheed X-17 research rocket has set a speed record of more than 9,000 mph in firings at Patrick Air Force Base, Florida.

The vehicle is used to test nose-cone figurations for the Air Force medium range and intercontinental ballistic missiles.

Thiokol Chemical Corp. manufactures X-17's five engines. Final engine is fired while rocket roars straight downward to reach maximum velocity.

X-15 rapidly nearing manufacturing stage

North American Aviation's rocket-powered X-15 research aircraft, the follow-on to Bell's X-1, X-1A and X-2 series, is rapidly nearing the manufacturing stage and fabrication of components is under way.

The only research aircraft of this type presently being built, the X-15 is scheduled to fly some time next year at Edwards Air Force Base.

Scott Crossfield, NACA experimental test pilot on the X-1, X-4, X-5, and D558-II, has been hired by North American for first flight and preliminary test phases, and will probably be backed up by North American's Al Blackburn.

Described as a conventional-appearing, medium-size aircraft in which fuel for the Reaction Motors' liquid propellant powerplant will be the main load, the X-15 is said to be "an honest, know-what-you're-doing airplane" and a "logical step in the state of the art as we know it today," according to Crossfield. He is also serving in an engineering capacity on the project.

A mockup of the X-15 is serving to solve many of the installation problems encountered with a complex research aircraft, and where it can be used to advantage, a complete, operating system has been assembled in the mockup for detailed studies.

Much attention has been given to pilot safety, and during a recent inspection of the project by aeromedical personnel from Kelly AFB, the concept of designing the pilot's gear as a part of the X-15 "package" was praised. The pilot's equipment will be supplied by the Air Force and is said to be "10 years ahead" in design.

Although exact details of the escape system are classified, the pilot is calculated to have a 92% chance of survival in even "the most dire emergencies," "We've got to draw the line somewhere or we have all escape system and no airplane," said Crossfield.

Expected to reach extremely high mach numbers and altitudes the X-15 is designed to withstand the extremely high skin temperatures encountered under such conditions, but no construction or material details have been released.

Two airlines push DC-3s to new high-density uses

Two airlines in the Pacific have pushed high-density utilization of the DC-3 to peaks considerably above those achieved by other operators on short routes.

Philippine Air Lines has six DC-3s converted to 40-passenger planes for use on low-fare, short-haul services that have proved both popular and profitable. Seating arrangement is 10 rows with a narrow aisle. Baggage capacity is small and average weight of passengers is low. Only the two main gas tanks have been retained. Total operating gross is 26,000 lbs.

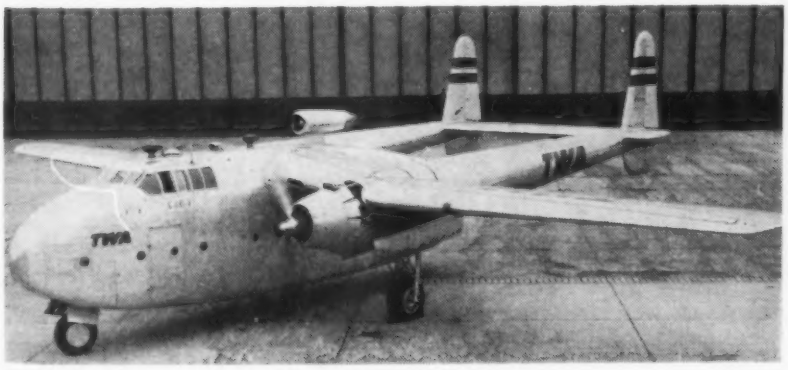
In New Guinea, Qantas Empire Airways, which operates an extensive service in the highlands and through the South Pacific Islands at the behest of the Australian government, has a 50-passenger DC-3 seating arrangement. This is used in contract operations, transporting natives relatively short distances, but is not flown in scheduled common carrier service.

Seats are canvas and are in rows, but additional seating is provided facing inward along the fuselage sides. Average weight of passengers is low; baggage is almost nil. Normal gross weight is not exceeded.

Pacific Airmotive to overhaul 707 engines

Pacific Airmotive Corp. and Continental Air Lines have reached the country's first commercial jet overhaul agreement. PAC will overhaul Pratt & Whitney J57 engines that will power the four Boeing 707s ordered by Continental for delivery in 1959.

PAC has been servicing military J57s since July 1953 and has reworked and modified more than 200 of them.



TWA maintenance transport gets jet assist

WORLD'S FIRST jet "flying maintenance base" is a Fairchild C-82 with both jet and propeller power operated by Trans World Airlines. Fairchild J44 engine on top gives aircraft 1,000 lbs. thrust additional power for take-off and climb performance. Airplane, used by TWA to transport spare engines and parts is on 24-hour alert at Orly Field, Paris.

CAB examiner recommends EAL for N.Y.-San Juan

A permanent certificate for Eastern Air Lines and a temporary permit for Trans Caribbean Airways on the New York-San Juan route have been recommended by CAB Chief Examiner Francis W. Brown.

He also urged that Riddle Airlines be granted a temporary New York-San Juan cargo certificate which would expire at the same time as the certificate granted Riddle in the North-South Airfreight Renewal Case. The cargo line, he added, should be authorized to carry mail on a non-subsidy basis over its certificated route.

EAL was granted a five-year New York-San Juan certificate in 1951, and Brown said the authorization should now be made permanent. Trans Caribbean, a large irregular carrier that has operated on the route for several years, was recommended for a three-year non-mail certificate.

"In view of Trans Caribbean's long association in the market and its history of successful operation, it is concluded that this company would best meet the need for an additional low-cost service between New York and San Juan," Brown said.

In other recommendations, he said that (1) Pan American's Puerto Rico certificate should be modified to designate Boston, Philadelphia, Baltimore and Washington as co-terminals with New York and Newark, (2) Miami should be redesignated as an intermediate point on EAL's routes 6 and 10 and as an intermediate on its Miami-San Juan route so as to make possible service over-flying Miami en route to San Juan on routes 6 and 10.

ALPA accuses 4 airlines of unrealistic schedules

Four airlines have been accused by the Air Line Pilots Association of "unrealistic scheduling."

In a complaint filed with CAB, ALPA asked that American, Eastern, National and TWA be required to comply with "standards of true scheduling which CAB itself has proposed." The Board last year proposed a rule that would require on-time completion of 75% of advertised schedules. The matter is still pending.

ALPA president C. N. Sayen told CAB that selection of the schedules of the four lines was "made at random" as illustrative of the practice and that other carriers also indulged.

Publishing of unrealistic schedules is a "deceptive practice" that "places an undue burden upon the pilots and other employes because it creates pressures on them to accomplish impossible schedules with a resultant threat to safety," Sayen said.

An ALPA study, he added, showed that "in some instances, flights failed to attain their scheduled time even once over a period of a month."

World Aviation Directory contains 26,500 listings

The 35th edition of the World Aviation Directory (formerly American Aviation World Wide Directory), the 1957 Spring-Summer issue, is now off the press, listing more than 26,500 names of aviation executives, organizations and products.

Copies of World Aviation Directory, which contains more than 1,000 pages of currently useful facts, are available from American Aviation Publications, 1001 Vermont Ave., N.W., Washington, D.C. Single copy price is $9 in U.S. and Canada, $10 in other countries.

BRIEFS

Manufacturing

Helicopter exports in first quarter of year totaled 64 valued at $10,905,510, according to Aircraft Industries Assn. This was nearly double exports for same period last year.

Aeronca Manufacturing Corp. stockholders voted an increase in common stock from 600,000 to a million. No plans are made to issue additional stock at this time.

The Martin Co. has accepted delivery of the second stage powerplant for Vanguard satellite. The nitric acid-hydrazine engine was built by Aerojet-General Corp.

All American Engineering Co. reports completion of successful tests in launching both piston and jet aircraft from what is called world's first turbine-powered catapult.

Transport

Hertz Corp. is expected to expand into the Latin American and Caribbean car rental market following acquisition of Couture Rent A Car System of Miami Beach. Deal was made through exchange of Hertz stock for Couture stock.

Continental Air Lines non-subsidy mail rates was formerly proposed by Civil Aeronautics Board effective April 28. Action is follow-up to voluntary offer by CAL to eliminate subsidy at the time Chicago-Denver-Los Angeles service was started.

United States and Korea signed an air transport agreement April 24. Under terms, U.S. carriers may provide service from U.S. via intermediate points to Seoul, Korea, and beyond.

Western Air Lines has made arrangements to accelerate delivery dates on part of its order for nine Lockheed Electras and now plans to start service in fall of 1959.

Trans World Airlines stockholders voted to inerease common stock from four to 10 million shares at annual meeting recently. Issue will be offered to holders of common stock at tentatively fixed rate of one-for-one.

FINANCIAL

McDonnell Aircraft Corp. reports three-quarter earnings after taxes of $6,212,152, or $4.07 per share, on sales of $217,787,083. Figures through March 31 a year ago were $4,399,312, $2.88 a share, sales $131,394,768.

Cessna Aircraft Co. has a military backlog of $91,750,000 compared to $41,700,000 a year ago. Sales for first three months this year were $17,233,000, up from $15,004,000 in 1956; earnings $852,300. Six-month earnings were $1,694,000.

Servomechanisms, Inc. directors declared regular quarterly dividend of 10¢ per share, payable May 15 to stockholders of record May 1. First quarter profit was $141,255 on sales of $4,559,835, compared with $137,569 on $3,359,806 sales a year ago.

Seaboard & Western Airlines reports first quarter revenues of $4,800,000, highest in five years. Military traffic accounted for 10% of total. S&W's transatlantic airfreight business was up 78% over same period in 1956.

General Dynamics Corp. reports increases of 93% in net sales and 103% in earnings for first quarter over same period in 1956. Sales were $334,607,000, earnings $8,793,767 or $1.13 per share. Last year figures were $173,473,000, $4,322,699 and 56¢ per share.

Fairchild Engine & Airplane Corp. reports a decline in profits during first three months of year. Sales were $37,237,000, profits $134,000. Last year earnings were $142,000 on sales of $32,359,000.

Republic Aviation Corp. reports first quarter sales of $76,645,222 and net earnings after taxes of $1,776,738 or $1.21 a share. This compares with figures a year ago of $81,798,731 sales, and $2,129,663 or $1.45 a share earnings.

North American Aviation reports six-month earnings after taxes of $18,482,000 or $2.31 a share. Last year for the same period earnings were $14,800,000 or $1.85 a share. Sales for the six months totaled $643,175,139. Backlog is $997,284,016.

Temco Aircraft Corp. first quarter sales were higher than last year but profits lower. Sales were $27,226,605, earnings $294,798. Backlog at March 31 was $170,000,000.

Pan American World Airways reports net income after taxes of $14,200,000 for 1956 compared to $10,200,000 the year before. Operating revenues jumped 21.4% to $289 million, including $214.7 million passenger revenue and $26.6 cargo revenue.

Delta Air Lines reports nine-month earnings of $1,534,123. Third quarter earnings were $742,000, down from $1,039,000 a year ago. Directors voted 30¢ per share dividend payable June 3 to stockholders of record May 10.

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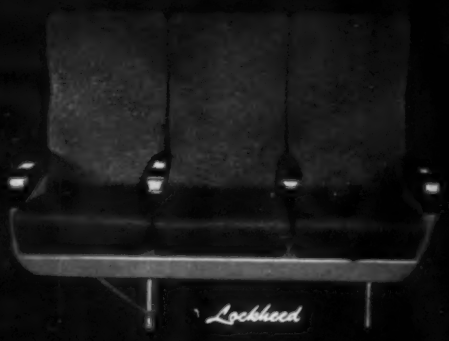

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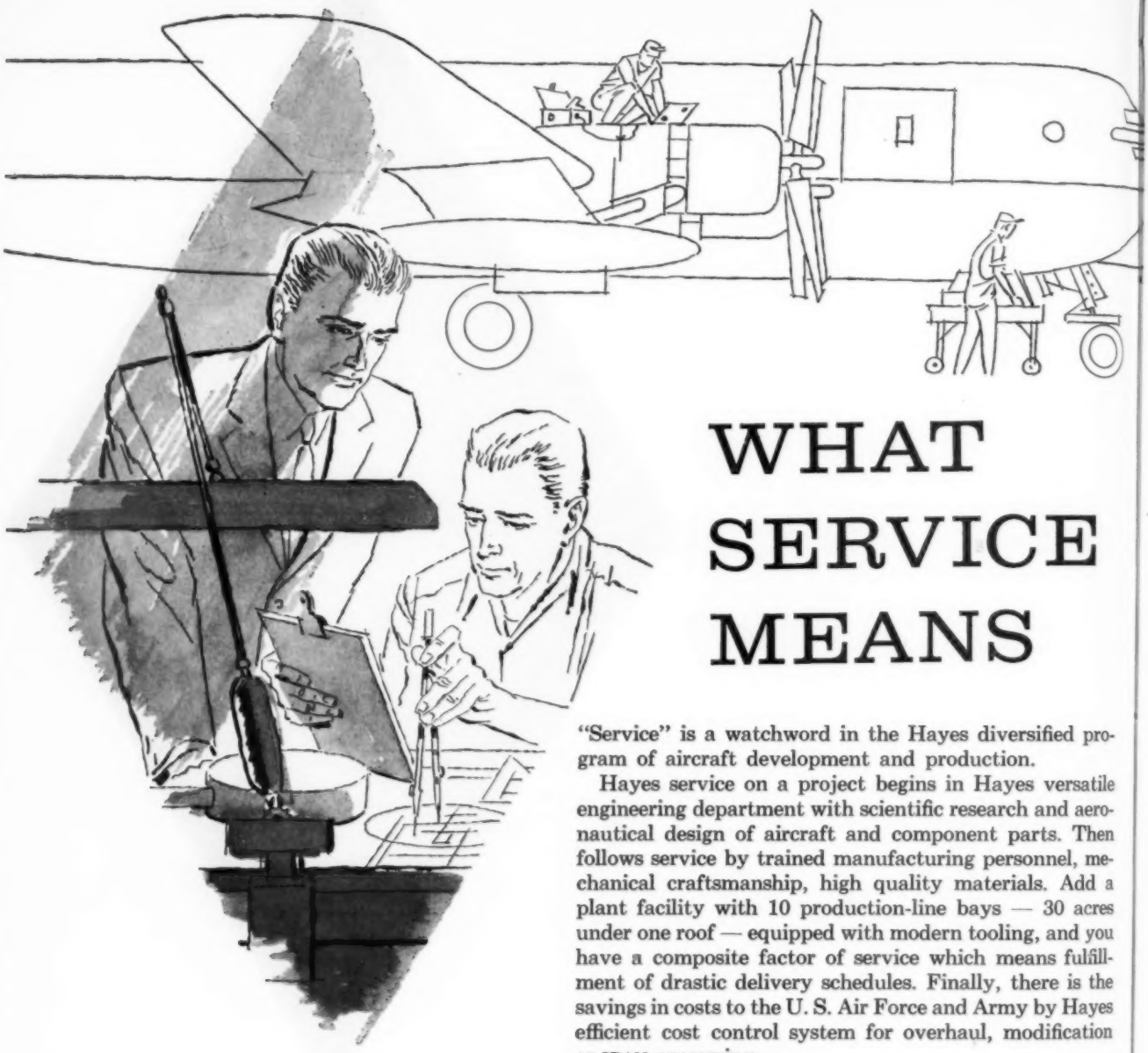

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Summary of U.S. airline traffic for February, 1957 vs. February, 1956

Compiled by American Aviation Publications from Official C.A.B. Data

Airlines	Revenue Passengers (In Thousands) 1957	1956	% Change	Revenue Passenger Miles (In Thousands) 1957	1956	% Change	Total Ton-Miles Rev. Traffic 1957	1956	% Change	% Available Ton-Miles Used 1957	1956
DOMESTIC											
American	514,830	535,304	—3.8	340,907	319,144	6.8	40,852,927	38,246,310	6.8	57.0	58.4
Braniff	143,624	139,063	3.3	59,890	52,117	14.9	6,377,312	5,538,091	15.2	45.8	54.0
Capital	253,378	181,758	39.4	94,900	57,140	66.1	9,762,546	6,116,388	59.6	45.3	43.4
Continental	53,914	50,052	7.7	19,844	17,931	10.7	2,091,337	1,900,925	10.0	45.1	43.7
Delta	195,125	174,144	12.0	99,599	84,688	17.6	10,109,082	9,188,052	10.0	54.8	57.9
Eastern	598,111	572,603	4.5	377,458	328,345	15.0	38,867,288	36,536,066	6.4	43.7	51.9
National	NA	133,647	...	101,758	102,913	—1.1	10,793,834	11,406,987	—5.4	54.5	71.3
Northeast	38,755	35,673	8.6	9,942	7,129	39.5	1,021,681	700,826	45.8	45.2	56.9
Northwest	82,505	89,067	—7.4	52,636	53,728	—2.0	6,207,899	6,463,835	—4.0	44.0	49.6
TWA	285,099	277,729	2.7	212,173	202,255	4.9	23,827,654	22,843,612	4.3	50.6	53.0
United	409,388	432,583	—5.4	288,392	277,141	4.1	34,363,538	32,813,778	4.7	53.0	55.5
Western	96,987	399	[2]	46,784	102	[2]	4,982,005	9,650	[2]	59.3	56.5
TOTALS	2,671,716	2,622,022	1.9	1,704,283	1,502,633	13.4	189,257,103	171,764,520	10.2	50.2	54.9
TERRITORIAL SERVICE											
Caribair	20,821	17,290	20.4	1,490	1,349	10.5	162,716	127,862	27.3	62.0	57.7
Hawaiian	26,712	25,376	5.3	4,098	3,574	14.7	455,481	400,876	13.6	57.6	48.5
Trans-Pacific	11,854	11,357	4.4	1,754	1,437	22.1	150,843	120,529	25.2	58.6	46.8
INTERNATIONAL											
American	12,633	11,199	12.8	9,983	8,581	16.3	1,365,511	1,171,207	16.6	78.8	79.9
Braniff	2,811	2,581	8.9	5,859	5,377	8.9	732,195	700,911	4.5	56.2	47.3
Delta	5,478	4,995	9.7	5,905	4,863	21.4	709,220	566,360	25.2	59.4	47.1
Eastern	20,760	14,947	38.9	27,460	20,506	33.9	3,090,985	2,376,864	30.0	59.8	56.1
National	NA	12,217	...	6,216	7,447	—16.5	694,690	805,038	—13.7	61.1	71.7
Northwest	6,737	6,180	9.0	14,969	12,923	15.8	3,119,724	2,935,477	6.3	61.4	64.8
Hawaiian	1,417	NA	...	3,939	NA	...	434,290	NA	...	67.8	NA
Panagra	11,096	11,291	—1.7	14,925	13,806	8.1	2,008,110	1,781,871	12.7	65.8	59.0
PAA											
Lat. Am.	94,096	100,071	—6.0	86,322	80,002	7.9	12,622,832	11,282,969	11.9	65.7	62.7
Atlantic	52,953	53,408	—0.9	68,787	64,564	6.5	10,697,033	9,616,462	11.2	58.7	57.4
Pacific	19,241	17,648	9.0	69,276	52,148	32.8	9,498,682	7,897,103	20.3	65.8	65.8
Honolulu	2,135	NA	...	5,913	NA	...	636,190	NA	...	57.5	NA
Alaska	3,045	4,037	—24.6	3,481	5,008	—30.5	531,978	784,457	—32.2	38.8	47.5
TWA	11,355	11,687	—2.9	28,792	29,650	—2.9	4,543,507	4,604,144	—1.3	64.4	66.0
United	6,250	5,821	7.4	15,573	14,490	7.5	1,737,631	1,644,792	5.6	59.7	59.4
TOTALS	246,455	256,083	—3.8	357,548	319,365	12.0	51,352,098	46,167,655	11.2	62.7	61.5
LOCAL SERVICE											
Allegheny	26,128	22,395	16.7	4,479	3,570	25.5	459,544	359,427	27.9	39.3	42.7
Bonanza	10,889	10,273	6.0	2,469	2,187	12.9	246,772	218,981	12.7	45.8	39.9
Central	6,436	6,488	—0.8	1,327	1,209	9.8	138,509	125,287	10.6	24.3	26.7
Frontier	14,365	15,218	—5.6	4,128	4,867	—15.2	466,151	537,994	—13.4	53.0	63.6
Lake Central	10,611	8,401	26.3	1,682	1,292	30.2	173,333	132,512	30.8	39.2	32.2
Mohawk	27,370	22,578	21.2	5,114	4,021	27.2	517,195	400,325	29.2	49.2	54.9
N. Central	42,981	34,753	23.7	6,922	5,239	32.1	701,883	541,317	29.7	46.7	43.1
Ozark	22,160	19,179	15.5	3,465	2,895	19.7	360,789	289,426	24.7	36.4	33.8
Piedmont	22,291	24,485	—9.0	4,606	4,656	—1.1	469,468	476,935	—1.6	44.4	44.8
Southern	14,305	12,414	15.2	2,552	2,141	19.2	262,053	222,614	17.7	40.3	38.6
Southwest	21,483	18,738	14.6	4,693	3,740	25.5	465,055	381,423	21.9	48.4	43.4
Trans-Texas	17,593	14,060	25.1	4,016	3,179	26.3	423,248	335,233	26.3	35.2	34.3
West Coast	16,620	14,186	17.2	2,998	2,576	16.4	295,158	252,088	17.1	42.7	50.0
TOTALS	253,232	223,168	13.5	48,451	41,572	16.5	4,979,158	4,273,562	16.5	42.7	42.9
HELICOPTER SERVICE											
HAS	1,146	.....	...	[3]	....	...	4,114	2,161	90.4	35.1	46.5
Los Angeles	2,483	1,095	126.8	[3]	45	82.2	12,660	10,257	23.4	57.3	47.4
N. Y. Airways	3,192	2,147	48.7	59	41	43.9	8,298	6,052	37.1	36.1	55.7
ALASKAN SERVICE											
Alaska [4]	3,993	2,376	68.0	1,141	603	89.2	281,623	198,211	42.1	52.0	52.8
[5]	243	205	18.5	375	315	19.0	191,686	174,602	9.7	35.4	31.6
Alaska Coast.	2,140	2,404	—11.0	189	211	—10.4	24,640	28,091	—12.3	63.8	63.2
Cordova	946	1,136	—16.7	180	142	26.8	41,111	50,579	—18.2	44.0	65.3
Ellis	2,317	2,629	—11.9	150	139	7.9	18,614	17,461	6.6	67.6	63.5
N. Consol.	1,089	871	25.0	368	291	26.5	162,520	233,561	—30.4	58.7	84.3
Pac. North	5,164	5,145	0.4	4,672	3,949	18.3	728,623	677,752	7.5	49.5	53.5
Reeve	163	147	10.9	163	90	81.1	37,697	26,558	41.9	64.6	57.7
Wien Alaska	1,062	1,700	—37.5	386	602	—35.9	346,938	789,068	—56.0	82.5	92.1
TOTALS	17,378	16,613	4.6	7,624	6,342	20.2	1,833,452	2,195,883	—16.5	52.8	60.8

[1] *Revenue Passenger Originations—Reflects an unduplicated count of passengers originating journey on the lines of each report entity.*
[2] *Revenue Passengers Carried—Reflects an unduplicated count of revenue passengers for each operation. Transfer passengers between separate operating units were eliminated, but layover passengers included.*
[3] *Figures for 1956 reflect strike period of 74 days.*
[4] *Alaska Airlines Inter-territorial routes.*
[5] *Alaska Airlines States-Alaska route.*

NA—Not available.

FACILITIES

Brush Electronics Co. has established a factory branch office at Los Angeles. Brush is a division of Clevite Corp., home office Cleveland, Ohio. West coast office will serve as western regional headquarters.

Servomechanisms, Inc., has laid cornerstone for $1-million plant at Westbury, L. I. Plant, scheduled for completion in the fall, will make electromechanical controls for aircraft and missiles.

Sylvania Electric Products, Inc., has started construction on 40,000 sq. ft. building for research and development at Waltham, Mass. Completion is set for October.

Hoover Electronics Co. has opened at Washington, D. C. office for liaison with Department of Defense. Location is 1025 Connecticut Ave.

Northrop Aircraft Inc., has moved its Utah office from Hill Air Force Base, Ogden, to 2406 Washington Blvd., Ogden.

Garrett Corp.'s Aero Engineering Division has opened branch office at Hillside, Ill. Office will handle company's business in Chicago area.

Friez Instrument Division of Bendix Aviation Corp. is adding 66,000 sq. ft. to its Baltimore plant. Space will be used to manufacture precision products for meteorological, aircraft, missile and other airborne equipment.

PEOPLE

Lt. Gen. Thomas S. Power (right), commander of Air Research and Development Command, has received a scroll inscribed by his staff and 10 ARDC Center commanders in commemoration of his third anniversary as boss of Air Force research organization. Maj. Gen. Albert Boyd, deputy commander for Weapons Systems of ARDC, presented the scroll which carried the inscription: "Most sincere and hearty congratulations from those who serve with you in this command."

Lt. Gen. Karl S. Day (left), highest ranking officer in Marine Corps Reserve history, has retired from the Corps but continues in his civilian position as director of the flight dispatch division of American Airlines. The Marine Corps Reserve Officers Assn. presented a silver punch bowl to him and Mrs. Day upon his retirement. Presentation was made by C. R. Smith (right), AA president and a major general in the Air Force Reserve.

W. A. Parkins (second from left) now heads up all Pratt & Whitney Aircraft operations as chief executive officer. This is first formal picture of new top P&WA management team under the expanded setup of the engine manufacturing company, which is a division of United Aircraft Corp. From left: L. C. Mallet, general manager P&WA Connecticut operations; Parkins; B. A. Schmickrath, general manager Canel operations (nuclear engine program at Middletown, Conn.), and C. T. Roelhe, general manager Florida operations (West Palm Beach). Parkins is vice president of UAC.

ST. JOHN

THOMAS

SILVEY

MERRILL

WILSON

BOLDING

MANUFACTURING

Name	New Position	Former Position
Harry St. John	Mgr. sales, Denver Div., Sundstrand Machine Tool Co.	With Hamilton Standard Div., United Aircraft
Wilbur W. Thomas, Jr	Chief engr., Sun Electric Corp.'s Aeronautical Div.	Electronic research and devel., Sun's Chicago plants
Karl I. Silvey	Mgr. information services dept., Aviation Gas Turbine Div., Westinghouse Electric Corp.	VP, Roche, Williams & Cleary, Inc.
Howard W. Merrill	VP The Martin Co., gen. mgr. at Baltimore	Dir. operations Baltimore Div.
J. Russell Clark	Chief engnr.-aircraft, Chance Vought	Asst. chief engnr.-aircraft projects
Samuel O. Perry	Chief engnr.-missiles, Chance Vought	Asst. chief engnr.-missile projects
Lee S. Johnson	VP, United Aircraft Corp.	Gen. mgr., Sikorsky Aircraft Div., United Aircraft
Theodore Voorhees	Gen. mgr., international div., Bendix Aviation Corp.	Asst. gen. mgr.
Howe H. Hopkins	Chief engr., Aircooled Motors, Inc.	Staff engr. and tech. admin., Continental Aviation & Engrg. Corp.
Richard W. Hodgson	Exec. vp and dir. research, Arnoux Corp.	VP-engrg.
Walter Y. Fish	VP-engrg., Arnoux Corp.	Chief engr.
J. Gilbert Nettleton, Jr.	VP, Northrop Aircraft, Inc.	VP-customer relations, Radioplane Co.
Manuel Lewis	Treas., Flight Enterprises, Inc.	Asst. treas.
Donald D. Skinner	Chief accountant, Narmco, Inc.	Admin. accountant, Convair-San Diego
H. Fisk Tarbox	Mgr. aviation sales dept., Mobil Overseas Oil Co.	Mktg. staff asst. to mgr., products dept.
Robert J. Seymour	Mgr. product planning, in addition to admin. asst. to vp-sales, Ford Instrument Co.	Adm. asst. to vp-sales
Edmund C. Bennett	Mgr. production test dept., Ford Instrument Co.	Asst. mgr. test and service dept.
John D. MacGuffin	Sales mgr., The Griggs Filtration Co., Washington, D.C.	Regional sales mgr., Chicago
Arthur S. Nippes	VP and gen. mgr., Henry Disston Div., H. K. Porter Co., Inc.	With Elliott Co.
Clare E. Barkalow	Asso. mgr., advanced engrg. div., Lear, Inc.	Engrg. mgr., Gyromechanisms Div., Norden-Ketay
Vernon A. Johnson	Dir. corporate outside offices, Lockheed Aircraft Corp., in addition to asst. to pres. and mgr. Washington office	Asst. to pres. and mgr. Washington office
Joseph R. Silverman	Exec. asst. to vp-production, Chance Vought Aircraft	Quality control mgr.
Jay J. Newman	Mgr. new product and mkt. devel., Components Div., Radio Corp. of America	In product analyzing and planning
Charles T. Thum	Mgr. special devices div., Lockheed Aircraft Service, Inc.	Gen. mgr., National Chain Co.
Daniel P. Byrnes	Asst. gen. counsel, North American Aviation, Inc.	Asst. counsel, BuAer
Joseph A. E. Hindman	Sales mgr., U.S. Gauge Div., American Machine and Metals, Inc.	Sales supv., process and industrial instruments
John F. Corkery	VP-pub. rel., Thor Power Tool Co.	Sales promotion mgr.
Burrell A. Parkhurst	Pres. Components Div., International Telephone and Telegraph Corp.	Exec. vp., Waldorf Instrument Corp.
James E. Fornero	Dir. govt. relations, Hydro-Aire, Inc.	Asst. to sr. vp
Alvin H. Rankin	Gen. mgr., S.M.S., Instrument and Assessories, Inc.	C.W.O. Air Force
Col. DeFois H. Siegfried	Asst. chief sales engr., Aircraft Armaments, Inc.	Asst. to pres., Airtronics, Inc.
A. J. Williamson	Pres., Tube Reducing Corp.	Exec. vp
T. E. Beehan	Secy., Aerojet-General Corp.	Asst. secy.-asst. treas.
R. I. McKenzie	Treas., Aerojet-General Corp.	Asst. secy.-asst. treas.
Chandler C. Ross	VP-engrg., Aerojet-General Corp.	Mgr. liquid engine div.
Robert B. Young	VP-liquid rocket plant, Aerojet-General Corp.	Resident mgr., liquid rocket plant, Sacramento
William Ohly	Mgr. distributor sales, Acro Div., Robertshaw-Fulton Controls Co.	Sales engr., Acro Mfg. Co.
E. A. (Pete) Lindsay	Pub. rel., adv. and sales promotion mgr., Pheoll Mfg. Co.	With American Hospital Supply Corp.
Thomas Harold "Pop" Warner	Customer service representative, Douglas-El Segundo	Chief Navy inspector, Douglas-Santa Monica

AIRLINE

Brig. Gen. Thomas B. Wilson	Chmn. bd, Resort Airlines	Deputy Undersecretary Commerce
Neil Berboth	Dir. maint., The Flying Tiger Line	Asst. to vp-operations
Edward H. Vogel	Admin. asst. to vp-maint., Riddle Airlines	Management consultant
Ake John Rusck	Pres. Scandinavian Airlines System (effective Jan. 1, 1958)	Civil engr., Swedish Power Admin.
A. L. Wheeler	VP, North Central Airlines	Attorney and dir.
Horace Bolding	VP-purchasing and stores, Braniff International Airways	Dir. purchasing and stores
Robert B. Phillips	Dir. training and publications, National Airlines	Instructor
Capt. W. B. Hooton	Regional flt. mgr., American Airlines, southern reg.	Senior pilot
R. L. Senn	Supt. dining service, United Air Lines	Staff supt.
Norman H. Golden	VP-engrg., Riddle Airlines	Chief engr.

GOVERNMENT

Preble (Pete) Staver	Asst. to Administrator, Civil Aeronautics Administration	Asst. to the pres., Air Transport Assn.
Paul Frankfurt	Information Services Officer, Ballistic Missiles Office, Air Materiel Command	A.M.C., Dayton
Col. Dean E. Hess	Dir. Los Angeles office of information services, USAF	Spec. asst. to deputy chief of staff for personnel, Pentagon

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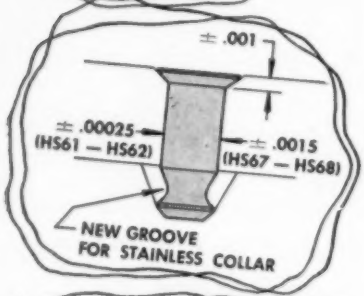

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Airlines report salaries of top executives

The following carriers have filed with the Civil Aeronautics Board reports listing the 1956 salaries and other compensation of officers and directors.

Allegheny Airlines—Leslie O. Barnes, pres. & dir., $25,000 salary (up $2,500), no bonus & indir.; Everett K. Arnold, vp & secy., $11,200 salary (up $400) no bonus & indir.; David L. Miller, vp-traffic & sales, $11,200 salary (up $400) no bonus & indir.; Walter J. Short, vp & treas., $12,500 salary (up $834) no bonus.

Persons other than directors, officers and employes who were paid more than $10,000 for personal services during 1956 were: Hale Stinson, Russell & Nickerson, N.Y.C., legal counsel, $25,000.

American Airlines, Inc.—C. R. Smith, pres. & dir., $75,000 salary, no bonus & indirect compensation; Wm. J. Hogan, sr. vp-finance, $60,000 salary (up $5,000), no bonus & indir.; C. W. Jacob, sr. vp & secy., $60,000 salary, no bonus & indir.; O. M. Mosier, sr. vp-opns. & dir., $60,000 salary (up $5,000), no bonus & indir.; C. R. Speers, sr. vp-sales, $50,000 salary (up $5,685), no bonus & indir.; T. L. Boyd, vp, $30,000 salary (up $4,583), no bonus & indir.; G. J. Brandewiede, vp, $32,500 salary, no bonus & indir.; R. E. S. Deichler, vp, $40,000 salary, no bonus & indir.; S. C. Dunlap, vp, $9,086 salary (entered office 7-18-56), no bonus & indir.; L. E. Glasgow, vp & comp., $33,125 salary (up $5,020), no bonus & indir.; W. H. Johnson, Jr., vp, $34,063 salary (up $3,458), no bonus & indir.; P. W. Kayser, vp, $35,000 salary (up $13,750), no bonus & indir.; W. Littlewood, vp, $31,563 salary (up $2,538), no bonus & indir.; J. B. Montgomery, vp, $33,125 salary, no bonus & indir.; N. L. Smith, vp, $30,000 salary (up $19,193), no bonus & indir.; G. C. Van Nostrand, vp, $30,261 salary (up $1,229), no bonus & indir.; M. Whitlock, vp, $27,500 salary (up $948), no bonus & indir.; P. G. Larle, treas., $22,500 salary, no bonus & indir.; M. A. MacIntyre, corporate counsel, $31,183 salary, no bonus & indir.; M. G. Beard, asst. vp, $22,500 salary, no bonus & indir.; J. H. Cobb, asst. vp, $22,457 salary, no bonus & indir.; J. V. Dooley, asst. vp, $17,022 salary, no bonus & indir.; R. A. Goebel, asst. vp, $7,500 salary, no bonus & indir.; T. F. Holden, asst. vp, $15,938 salary, no bonus & indir.; J. D. Hungerford, asst. vp, $18,132 salary, no bonus & indir.; W. C. Lawrence, asst. vp, $22,250 salary, no bonus & indir.; D. F. O'Donoghue, asst. vp, $9,375 salary, no bonus & indir.; M. L. Rinehart, asst. vp & asst. treas., $26,250 salary (up $2,198), no bonus & indir.; M. W. Shipley, asst. vp, $19,063 salary (up $2,131), no bonus & indir.; W. G. Whitney, asst. vp, $19,539 salary, no bonus & indir.; V. J. Long, asst. comp. & asst. secy., $21,250 salary, no bonus & indir.; C. N. Ousler, asst. comp., $24,688 salary (up $3,894), no bonus & indir.; W. J. Corbett, asst. treas. & asst. secy., $16,250 salary (up $2,198), no bonus & indir.; A. A. Paradis, asst. secy., $14,625 salary (up $1,004), no bonus & indir.; A. R. Bone, Jr., regional vp, $26,563 salary (up $2,511), no bonus & indir.; W. N. Bump, reg. vp, $30,000 salary (up $5,322), no bonus & indir.; R. L. Fitzpatrick, reg. vp, $15,830 salary, no bonus & indir.; S. G. King, reg. vp, $25,000 salary, no bonus & indir.; H. J. Lyall, reg. vp, $20,000 salary (up $4,387), no bonus & indir.

Persons other than directors, officers, and employes who were paid more than $10,000 for personal services during 1956 were: Alvord & Alvord, Washington, D.C., legal, $21,320; Raymond E. Buck, Ft. Worth, legal, $14,000; Covington & Burling, Washington, D.C., legal, $273,000; Debevoise, Plimpton & McLean, N.Y.C., legal, $217,151; W. C. Gilman, Econ. Consultant, $18,503; Wyatt C. Hedrick, architect, $44,995; Kahn & Jacobs, N.Y.C., architect, $328,010; Lazard, Freres, investment banker, $60,000; McKinsey & Co., management consultants, $107,650; Naess & Murphy, architect, $18,754; G. Batchelder Ollinger, consulting engr., $15,413; Quinton Engineers, Ltd., architect, $70,122; Skidmore, Owings & Merrill, Chicago, architect, $17,981; Hewitt C. Wells, architect, $19,603; Wallace & Clark, management consultants, $28,823 and Arthur Young & Co., N.Y.C., public accountants, $42,685.

Eastern Air Lines—E. V. Rickenbacker, chm. of bd., gen. mgr. & dir., $50,000 salary, $800 bonus & indir.; T. F. Armstrong, pres. & dir., $35,000 salary, $5,703 bonus & indir.; P. H. Brattain, 1st vp & dir., $32,500 salary, $7,854 bonus & indir.; S. L. Shannon, sr. vp & dir., $30,000 salary, $5,418 bonus & indir.; G. A. Smith, 2d vp, $20,000 salary (up $13,334), no bonus & indir.; T. E. Creighton, treas. & dir., $17,500 salary, $2,144 bonus & indir.; L. P. Arnold, vp & dir., $22,500 salary, $4,143 bonus & indir.; M. M. Frost, vp, $27,500 salary, $3,549 bonus & indir.; W. L. Morrisette, Jr., vp $17,500 salary, $1,179 bonus & indir.; William Van Dusen, vp, $20,000 salary, $2,244 bonus & indir.; Charles Froesch, vp, $17,083 salary (up $2,083), $3,107 bonus & indir.; J. H. Brock, vp, $20,000 salary, $2,724 bonus & indir.; Robert Ramspeck, vp, $20,000 salary, no bonus & indir.; B. T. Dykes, vp, $17,266 salary, $3,334 bonus & indir.; F. L. Farley, secy., $13,980 salary (down $1,020), $1,520 bonus & indir.; J. K. Kilcarr, asst. treas., $12,000 salary (up $1,750), $739 bonus & indir.; J. C. Warlick, asst. secy., $10,000 salary, $941 bonus & indir.; R. S. Lipp, asst. secy., $4,355 salary, $227 bonus & indir.; E. R. Cook, dir.; $200 dir. fee; P. M. Davis, dir., $400 dir. fee; G. B. Howell, dir., $300 dir. fee; H. Knowlton, dir., $400 dir. fee; S. Peabody, dir., $400 dir. fee; P. E. Reinhold, dir., $500 dir. fee; L. S. Rockefeller, dir., $600 dir. fee; McGregor Smith, dir., $500, dir. fee; W. L. Moore, dir., $800 dir. fee.

Persons other than directors, officers, and employes who were paid more than $10,000 for personal services during 1956 were: Gambrell, Harlan, Russell, Moye & Richardson, legal, $178,841; Dewey, Ballantine, Bushby, Palmer & Wood, legal, $51,450, Price Waterhouse, auditing, $24,669; O. H. Lyon, consultant, $12,000.

Trans World Airlines, Inc.—Ralph S. Damon[1], pres. and dir., $11,318 salary (down $73,681, $16,275 bonus & indirect compensation; Warren Lee Pierson, chm. bd., $64,999 salary, $23,729 bonus & indir., $1,100 dir. fees; J. A. Collins, exec. vp & dir., $64,291 salary (up $16,291), $20,855 bonus & indir., $1,200 dir. fees; E. O. Cocke, sr. vp-sales and dir., $34,999 salary (up $83), $13,242 bonus & indir., $1,200 dir. fees; A. V. Leslie, sr. vp-finance, treas. & dir., $34,999 salary (up $83), $9,479 bonus & indir., $1,200 dir. fees; George H. Clay, vp, secy. and dir.[2], $24,000 salary, $7,173 bonus & indir., $800 dir. fees; Fred G. Betts, vp-purchasing[3], $16,025 salary, $3,012 bonus & indir.; John H. Clemson, vp-pass. service, $25,000 salary (up $21,042), $4,701 bonus & indir.; Frank E. Busch, vp-operations[3], $21,732 salary, $4,698 bonus & indir.; Pierre G. Desautels, vp-overseas[3], $16,795 salary, $1,232 bonus & indir.; R. M. Dunn, vp-overhaul & maint.[3], $16,441 salary, $1,442 bonus & indir.; Clyde S. Fullerton, vp & gen. sales mgr.[3], $18,775 salary, $2,194 bonus & indir.; Gordon L. Gilmore, vp-pub. rel., $19,999 salary (up $83), $5,236 bonus & indir.; David W. Harris, vp-ind. rel.[4], $15,184 salary (down $6,732), $4,493 bonus & indir.; Joseph W. Letzkus, vp-regional sales[3], $20,010 salary, $1,860 bonus & indir.; Louis P. Marechal, vp-reg. sales[3], $13,337 salary, $1,172 bonus & indir.; Richard Mazzarrini, vp reg. sales[3], $16,904 salary, $1,261 bonus & indir.; C. E. McCollum, vp-reg. sales[3], $14,803 salary, $3,451 bonus & indir.; Robert E. Montgomery, vp-reg. sales[3], $15,585 salary, $1,724 bonus & indir.; R. W. Rummel, vp-engrg.[3], $15,210 salary, $1,076 bonus & indir.; Arthur L. Stewart, vp-reg. sales[3], $15,171 salary, $96 bonus & indir.; Thomas K. Taylor, vp, $24,000 salary (up $83), $5,778 bonus & indir.; J. Woodrow Thomas, vp[3], $14,284 salary, $1,048 bonus & indir.; J. L. Weller, vp-planning & coordination, $22,000 salary (up $83), $5,609 bonus & indir.; Fred W. Ayres, dir., $600 dir. fee, $140 bonus & indir.; John E. Bierworth[5], dir., $10 bonus & indir.; Palmer Bradley, dir., $1,200 dir. fee (up $200), $140 bonus & indir.; Powell Crosley, Jr.[6], $100 dir. fee, $44 bonus & indir.; Noah Dietrich, dir., $800 dir. fee, $140 bonus & indir.; Arthur Eisenhower, dir., $800 dir. fee (up $100), $140 bonus & indir.; Oscar Holcombe, dir., $1,000 dir. fee (up $200), $140 bonus & indir.; Sidney Maestre, dir., $1,100 dir. fee (up $400), $140 bonus & indir.; D. J. Martin[7], dir., $400 dir. fee, $95 bonus & indir.; M. E. Montrose, dir., $700 dir. fee (up $700), $140 bonus & indir.; C. H. Price, dir., $500 dir. fee, $95 bonus & indir.; H. E. Rogers, dir., $1,100 dir. fee (up $100), $140 bonus & indir.; Ben-Fleming Sessel, dir., $1,000 dir. fee (up $1,000), $140 bonus & indir.; A. D. Simpson, dir., $1,100 dir. fee (up $200), $140 bonus & indir.; T. A. Slack, dir., $600 dir. fee (up $400), $140 bonus & indir.; Loyd Wright, dir.; $700 dir. fee (up $400), $140 bonus & indir.

Persons other than directors, officers and employes who were paid more than $10,000 for personal services were: Chadbourne, Park, Whiteside & Wolff, N.Y.C., legal (Oct. 1955 to Oct. 1956) $388,500; Haskins & Sells, Kansas City, Mo., auditing (Nov. 1955 to Dec. 1956) $70,870; Airport Medical Center,

1955 to Aug. 1956) $30,755; Brink's Inc., Chicago, protective services (Dec. 1955 to Dec. 1956) $36,380; Wm. J. Burns International Detective Agency Inc., N.Y.C., guard services (Nov. 1955 to Nov. 1956) $25,515; Barkers Flying Service, Kansas City, Mo., training services (Feb. 1956 to Dec. 1956) $21,847; Central Watch Service, Chicago, janitor services (Jan. to Dec. 1956) $17,844; Coverdale & Colpitts, N.Y.C., consulting engineers, $12,000; Foote, Cone & Belding, N.Y.C., advertising (Aug. to Dec. 1956) $18,634; Ruby D. Garrett, Kansas City, Mo., legal (Dec. 1955 to Nov. 1956) $11,100; Hile-Damroth Inc., N.Y.C., consultation, planning etc. (Dec. 1955 to Aug. 1956) $10,000; Russell G. Phillips, New Canaan, Conn., consultant services (Jan. to Dec. 1956) $12,000; Pillsbury, Madison & Sutro, San Francisco, legal (June 14, and July 10, 1956) $22,600; Universal Agency, Inc., Hollywood, Calif., advertising (Jan. to Dec. 1956) $43,810; Ward, Plunkett & Co., Detroit, legal (Nov. 20, 1956) $10,000; Wright, Wright, Green & Wright, Los Angeles, legal (Dec. 1955 to Nov. 1956) $11,200.

[1] Deceased Jan. 4, 1956.

[2] Elected dir., Apr. 26, 1956.

[3] Elected to present position, Mar. 24, 1956.

[4] Resigned May 31, 1956.

[5] Resigned Jan. 27, 1956.

[6] Resigned Apr. 26, 1956.

[7] Elected Apr. 25, resigned Dec. 17, 1956.

United Air Lines, Inc.—W. A. Patterson, pres., $100,000 salary, no bonus & indir.; R. E. Johnson, vp & asst. to pres., $50,000 salary (up $5,000); J. A. Herlihy, vp engrg. & maint., $50,000 salary (up $4,000); D. F. Magarrell, vp transportation services, $50,000 salary (up $5,000); D. R. Petty, vp flight oper., $45,000 salary (up $5,000); Curtis Barkes, vp finance & property, $40,000 salary (up $8,000); R. F. Ahrens, vp personnel, $35,000 salary (up $5,000); Hal E. Nourse, vp economic controls, $30,000 salary (up $3,000); R. W. Ireland, vp traffic admin., $27,000 salary; C. F. McErlean, vp & asst. to pres., $27,500 salary; S. P. Martin, secy. of corp. and asst. to pres.; $18,000 salary (up $1,500); Rexford E. Bruno, comptroller, $19,000 salary (up $2,200); A. M. de Voursney, treas. & asst. secy., $20,000 salary (up $2,500); Martin C. Ansorge, dir., $3,000 director's fee (down $250), no bonus & indir.; Paul A. Bissinger, dir., $2,750 dir. fee (up $150); H. Templeton Brown, dir., $3,000 dir. fee (up $150); Gardner Cowles, dir., $2,250 dir. fee (up $600); Justin W. Dart, dir. $2,250 dir. fee.

Thomas F. Gleed, dir., $3,000 dir. fee (up $1,398); Paul G. Hoffman, $2,500 dir. fee (down $250); Eric A. Johnston, dir., $2,500 dir. fee; John J. Mitchell, dir., $2,500 dir. fee (down $250) Aksel Nielsen, dir., $2,750 dir. fee (up $298); Vernon Stauffer, dir., $2,750 dir. fee (up $1,498).

Persons other than directors, officers, and employes who were paid more than $10,000 for personal services were: Mayer, Friedlich, Spiess, Tierney, Brown & Platt, Chicago, legal, $236,032; Skidmore, Owings & Merrill, Chicago architect and engineering services (1955-1956) $183,547; Arthur Anderson, Chicago, auditing, $25,475; James Francis Reilly, Washington, D.C., Washington legal counsel, $30,200; Theiss, Olson, Micklenburger, Van Hoist & Coltman, Chicago, legal fees on patents, $19,151; Raymond Loewy Associates, Inc., Chicago, designing service, $154,743; H. J. Brunnier, San Francisco, engineering service, $24,313; Temple H. Buell, Denver, architectural service, $16,574.

Young, Richardson, Carleton & Deltie, Seattle, architect-engineering, $43,830; Broheck, Phlege & Harrison, San Francisco, legal, $15,166; Anshen & Allen, San Francisco, consulting and engineering, $18,309; Kahn & Jacobs, architect service, $10,255.

Pan-American Grace Airways—Douglas Campbell, vp & gen. mgr., $25,875 salary (up $1,875), $7,000 bonus; T. J. Kirkland, vp, $23,625 (up $5,625), $5,000 bonus; E. G. Bern (died 11-23-56), vp, $17,312 salary (down $689), no bonus; C. S. Collins, vp, $15,916 salary (down $2,416), $1,300 bonus; A. J. Phelan, asst. comp. $13,958 salary (up $758), $1,300 bonus; W. F. Lewis, asst. treas., $12,200 salary (up $450), $850 bonus; E. E. Spencer, asst. treas., $11,083 salary (up $417), $850 bonus.

Persons other than directors, officers and employes who were paid more than $10,000 for personal services during 1956 were.

Covington & Burling, legal, $35,700; White & Case, legal, $10,000; Price Waterhouse & Co., accounting, $11,250.

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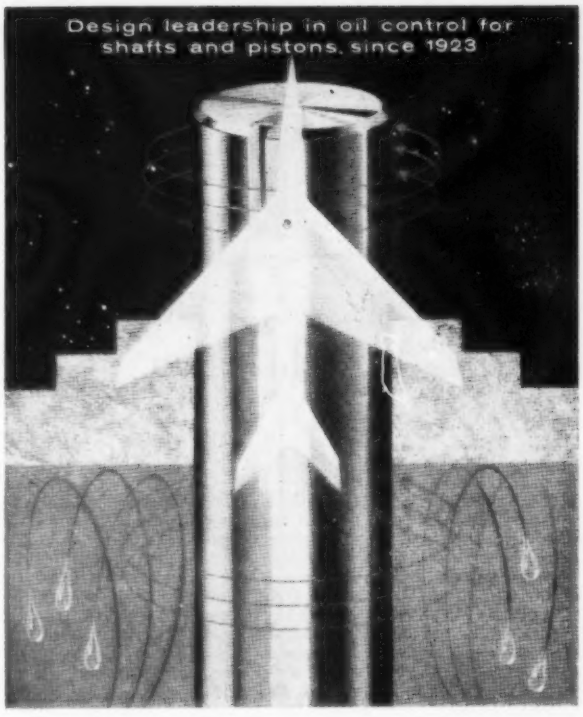

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EN ROUTE

by Wayne W. Parrish

Traveler in Tokyo: he'll be back

THERE ARE FEW COUNTRIES in the world I know less about than Japan. A few days there on the Northwest Airlines proving flight in 1947, when conditions were bad, and five days in Tokyo at the end of the SAS polar flight from Europe haven't been enough to give me a good feel for the place. Some day I want to spend some time there.

Tokyo is one of the world's busiest, biggest, liveliest, most bustling and most interesting cities. Its population is approaching 6 million. There are crowds everywhere. Traffic is heavy. Buses are jammed. Neon lights at night are unusually colorful. Stores are loaded with merchandise of every description. The people are on the move.

It was a treat to stay at the Imperial Hotel, designed years ago by Frank Lloyd Wright, and one of the fine hostelries of the world. I would pick another hotel, probably, if I went to Tokyo again, but the Imperial is a "must" for one visit, at least. The new section in the rear, a very long walk from the front desk, is ultra-modern and comfortable. The room service is exceptionally good.

One of the first things a visitor to Tokyo notices is the singular politeness of the people. I can't remember any hotel in the world where the help has been so pleasant as at the Imperial, although the mail distribution is poor.

Social research report

There's a lot I don't know about Tokyo. In the interests of my social research for this page I should have done better. But the fact is that I was so busy getting some work done and seeing some people that I skipped the night life completely. Tokyo has been noted for centuries for its vast organized prostitution—now being outlawed—but I sure wouldn't have known about it from where I was.

Of course a few of us including John B. Walker, whose public relations firm handled the SAS inaugural, did do a small bit of slumming briefly one night when a local Japanese newsman wanted some of us to see a few specialty acts performed by experts and I must say there were several feats of skill I had never witnessed before. One trick involved a common thing like a hard-boiled egg with rather revealing and nerve-shattering results and another involved a particularly difficult bit of art sketching. Ah, these Japanese, they are adept and imaginative. I've kicked myself ever since for not having had my initials painted in Japanese characters as this would have been a rare souvenir considering how the artistry is accomplished.

(If the above description isn't exactly clear, it's the best I can do; old Japanese hands should have no difficulty.)

I've always wanted to partake of a genuine Japanese dinner and thanks to Tony Senda, the capable and smart public relations director of Japan Air Lines, I had the best in Tokyo. Along with Nobuo Matsummura, deputy general manager of traffic and sales, we went to a fine restaurant owned by Tony's family. It was a rare experience, at least for me.

It was unlike any restaurant you've ever seen in the U.S. There were no regular tables and chairs, just a series of spacious rooms with mats on the floors and big tables very low to the floor. There was no other furniture. We squatted on the floor and I must say that by the time I got up my tired old bones were beginning to creak. It was a good thing that there were back rests available as I couldn't have lasted out otherwise. But actually it wasn't too bad, sitting there with crossed legs and back fitted comfortably against the back rest.

When we entered the restaurant we went first to a room with regular chairs and cocktail tables and had a round of martinis. I guess this was in my honor. Then we took off our shoes with a lot of assistance from the female help and thank the Good Lord I was wearing some socks without holes.

I can't begin to describe the food. It came in a continuous series of courses, so much that I couldn't possibly eat everything. I hope Tony will forgive me when I say that I'm not a full-fledged fan of real Japanese food because I'm allergic to all seafood except oysters and the Japs mix something from the sea in a great many of their dishes. Everything was beautifully prepared, however, and the best description I can give is that it was a feast fit for all those kings who can eat seafood.

We had warm sake, the Japanese rice beer, and every time I had a sip one of the ten million gowned and slippered Japanese gals in attendance filled up the glass again. I can take sake or leave it. I discovered that Tony Senda is a Scotch fan so pretty soon we were all drinking the imported stuff from Scotland.

About Japanese women

Well, now, what about those ten million gals? Were they geisha girls, or waitresses, or what? I was afraid to show my ignorance by asking, but believe you me, father, son and all distant cousins, I've never had so much service in my life. The graceful servility of the Japanese female, if servility is the right word, is something to behold. I decided right then and there that I would get my wife on the right beam when I got home but I guess I don't have the right key, I sure ain't got nowhere on that project. Repeat, nowhere.

Tony's mother, a woman of fine features, joined us for awhile and the restaurant being a family affair the girls and mama were chattering all sorts of things which I couldn't understand. But I had the feeling that I was in a home, not a restaurant. I had heard how the Japanese women are dedicated to service, but it was a revelation to see such service in action. My slightest movement to pick up a cigaret meant that a light was waiting before I could get the thing to my mouth. Boy, how long has this sort of thing been going on, anyway? And how did the Japanese male ever succeed in putting it over?

At the close of the dinner, I was presented a set of very beautiful Japanese water colors and a handsome JAL lighter. The conversation had ranged from airline talk to Far East politics, Red China, and all sorts of things. It was one of the most engaging evenings I've spent in a long time.

Tony Senda is a rarity in Japan, or let me say rather that he is a pioneer in a new activity in that country, that of public relations. A former newspaperman, he is a sophisticated, well-educated and internationally-minded young Japanese who has built up quite a reputation already in the airline business. I gotta go back to Tokyo. I'm tired of lighting my own cigarets and dishing out my own food.

NEW PRODUCTS

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COMMUNICATIONS, NAVIGATION UNIT. Incorporates 12-channel vhf transmitter, self-contained power supply, vhf receiver tunable between 108 and 127 megacycles, Omni navigation system with two-stage course selector. National Aeronautical Corp.

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RAM AIR SCOOPS. Unit contoured to fuselage shape, opened or closed to any of six settings in instant by lever. Settings permit openings into slip stream from ⅛ to ¾". Scoop measures 2x3" and interior plate, 5x7". Wm. R. Whittaker Co., Ltd.

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FLUSH LATCH. Eliminates need for expensive contoured shims, incorporates all desirable features of Missile-Air series M-1100 basic design. Made of stainless steel with aluminum alloy buttons. Missile-Air.

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WEDGE CABINET. Joins rectangular cabinets or racks in semi-circular unit so that operator has finger-tip control of instrumentation, automation and similar equipment housed in cabinets. Elgin Metalformers Corp.

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ULTRASONIC TEST EQUIPMENT. Automatic detection and recording devices will spot thickness changes in metals and plastics as small as 5/100 of 1%. Can be connected to ring an alarm, flash a light, or activate compensating controls. Branson Instruments, Inc.

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MINIATURE LOCKING INSERTS. Self-locking thread inserts meet needs of design engineers over wide range of small, precision applications. 4-40 series designed to reduce space, weight limitations for electronic, aviation instrument assemblies. Heli-Coil Corp.

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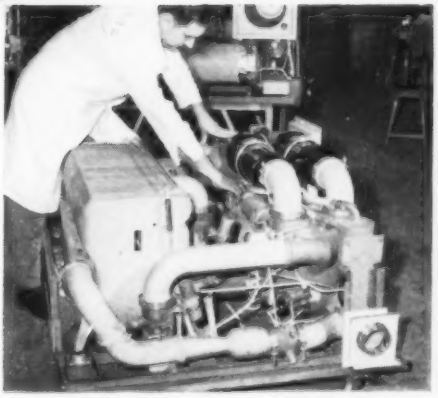

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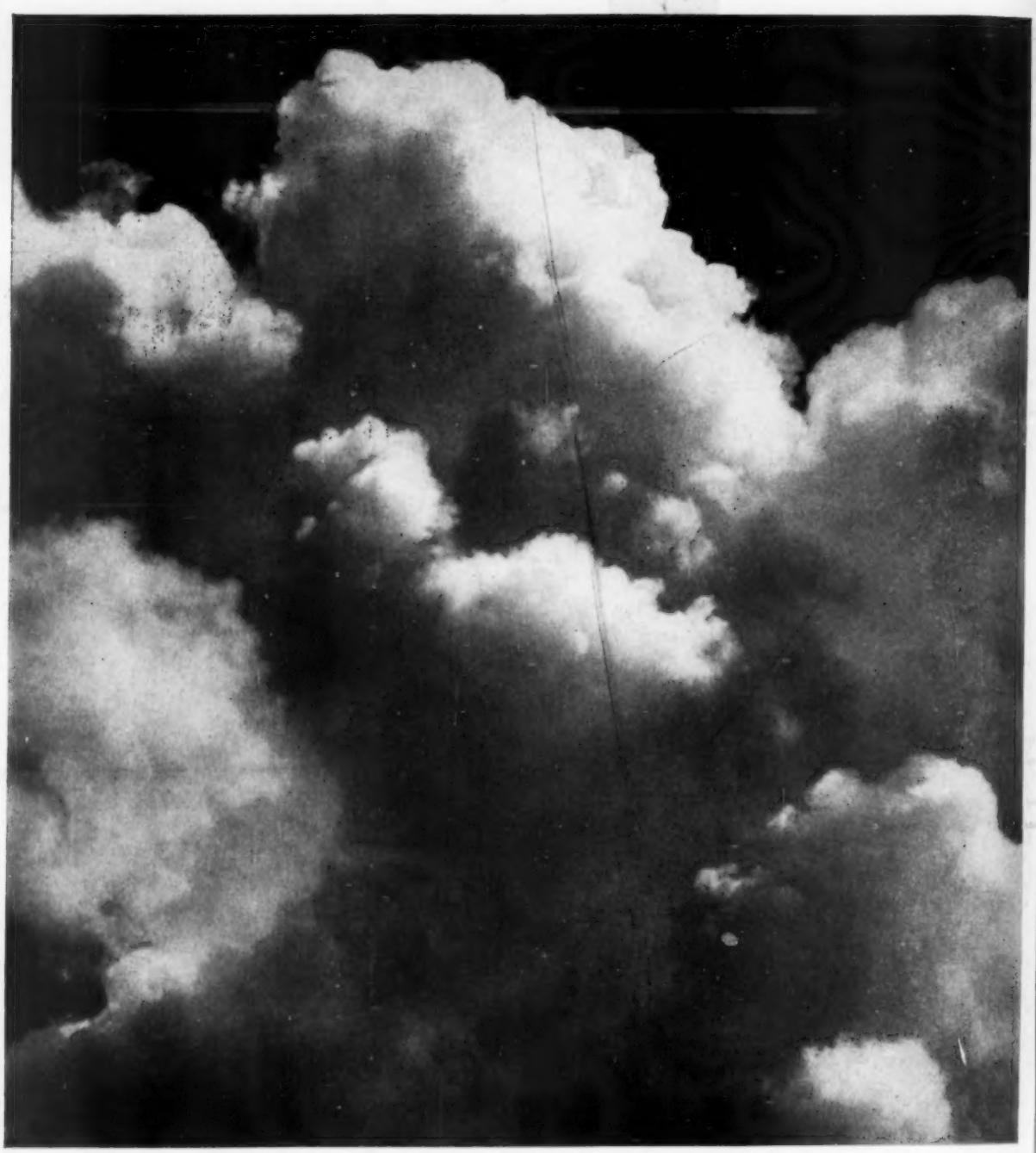

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